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COMPUTERWORLD

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DP sites drip-dry in Chicago

BY JEAN S. BOZMAN
CW STAFF

Heavy rains that deluged the Chicago area 11 days ago disrupted dozens of MIS departments and left five still operating in disaster recovery hot sites last week.

The rains dumped nine inches of water on the Chicago area in an eight-hour period beginning the evening of Aug. 13. By the next morning, the worst fears were realized at A. M. Castle & Co. headquarters, where a ground floor computer room housing an IBM 4381 Group 2 and an IBM 4341 Group 12 machine were covered by several inches of water.

The water was contaminated with sewer effluent, and all power to the building went out. But data processing managers waited before declaring a state of emergency, gauging whether the water would recede.

During the record-breaking rainstorm, many other MIS operations faced power failures and water damage but managed to get back on-line without leaving their home sites — sometimes by replacing ruined computers.

'Underwater for days'

A number of large IBM shops were flooded during the storm, which was estimated to have caused at least $77 million in damage to area businesses. "Some of our clients had computer rooms that were underwater for several days," said Ray Hipp, president of Comdisco Disaster Recovery Services, Inc. in Chicago.

As MIS operations lost power and telephone service, at least 10 shops chose to issue an alert and notify disaster recovery services that they might need help.

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Price shift rocks software arena

BY ROSEMARY HAMILTON
CW STAFF

Major independent mainframe software vendors are moving rapidly to adopt graduated pricing structures that reflect the tiered pricing policy IBM announced late last year.

The revisions could bring sweeping changes to IBM mainframe shops, most of which have purchased software that was priced according to the operating system under which it ran.

Four software companies — Cullinet Software, Inc., Applied Data Research, Inc., On-Line Software International, Inc. and Software AG of North America, Inc. — plan to adopt graduated pricing schedules next month. In addition, Cincom Systems, Inc. has a similar move scheduled for October.

The new policies will have users paying a fraction of the current cost of mainframe software for products that run on IBM's 9370 minicomputers, which began shipping last month. For example, ADR last week said 9370 users will pay between 15% and 35% of the current software price under its tiered scheme.

The pricing structures will also bring price hikes to high-end users, particularly for IBM MVS systems utilities and applications.

"You have got to be flexible now," said Jeffrey P. Papows, vice-president of marketing at Cullinet. "The trend is evident. It presents an illogical comparison to charge more for a software license than what the hardware costs in some cases."

Paul Fusco, director of MIS at General Cinema Theaters, Inc. in Chestnut Hill, Mass., said he will not put purchasing plans on hold while the software companies sort out pricing details. One of Fusco's major vendors is ADR.

"If we were looking for something from ADR, and we were ready for it, I wouldn't wait," Fusco said. "But if they came out

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CASE made for DB2 tool

Host-based software integrates data dictionary

BY ALAN ALPER
CW STAFF

NEW YORK — Eyeing two of the year's hottest software markets — computer-aided software engineering and IBM DB2 development — On-Line Software International, Inc. last week introduced a mainframe-based CASE system wrapped around a data dictionary that the company said can support production-level DB2 applications.

Officials claimed that the IBM MVS-based Casepac, which was developed by Tata Consultancy Services in Bombay, India, can handle more than 90% of all application development life cycle functions. It will eventually be tied to a Cobol code generator to create applications directly from entity models, which mirror an organization's structure.

However, some observers last week questioned Casepac's richness as a software engineering environment and said it ap-

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CHAPTER TWO

Play it again, MIS

BY KATHY CHIN LEONG
CW STAFF

When Charles Oldenburg addresses Decworld attendees next month on the issue of technology management, he will draw on his 35 years of experience in MIS at Chevron Corp. But Oldenburg will not go to Decworld representing Chevron.

Retired since last year, 58-year-old Oldenburg is one of a growing number of MIS professionals who are finding second careers after retiring from their full-time jobs. For Oldenburg, retirement has meant a full schedule of lectures and consulting.

But for others, adjusting to a new life-style after retirement has been difficult. Fearing stagnation, many continue in consulting or education roles, but some find it as easy to be overworked in "semiretirement" as in a full-time career. The number of MIS professionals reaching retirement age will swell in coming years as the

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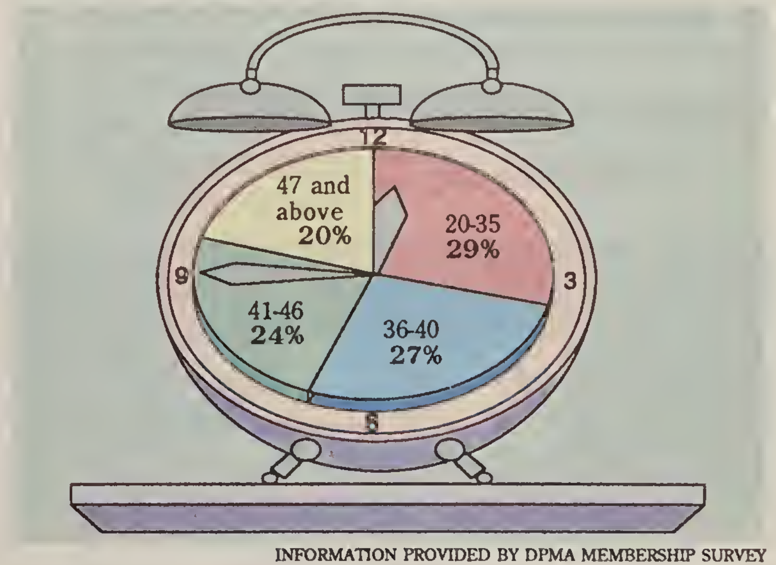
Second time around

One in five MIS professionals is nearing retirement age, and many in this group are pursuing second careers



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NEWSPAPER

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Linking up. Avanti centralizes reporting, diagnostic features in its Open Network Management System for nontechnical users. Page 4.

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Quotable

"While it would seem some — including, perhaps, our competitors — might like to see us sell McCormack & Dodge, I'm afraid I must disappoint them."

CHARLES W. MORITZ
DUN & BRADSTREET CORP.

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Pan Am slices Sabre

Says American could not solve software woes

BY DAVID A. LUDLUM
CW STAFF

Software problems undercut the effort to blend Pan American World Airways' reservation system into American Airlines' Sabre, a Pan Am executive said last week.

American and Pan Am recently said they were breaking off the 14-month-old agreement. The abrogation ended disputes that led Pan Am to withhold payments and American to respond by filing a lawsuit.

The chief problem arose in modifications for calculating international fares, according to Robert Mann, Pan Am's vice-president of marketing information systems.

Test runs produced excessively high fares, which could scare off customers, and inaccurately low ones, which could eat up profits, he said.

"The accuracy was not at all evident to us," Mann said. "It was not even close to what our existing software could provide. We could not function with the level of functionality American was going to provide."

American officials could not be reached for comment.

With international flights accounting for about 70% of its business, Pan Am must calculate international fares much more frequently than American, whose business involves at least 70% domestic flights.

While Sabre is the most widely used airline reservation system, in "a large degree of cases" it cannot calculate international fares, which involve complex conditional routines, according to Mann.

When Sabre cannot calculate an international fare, operators contact the principal airline involved by telephone or a Sabre data link, and employees of that carrier price the flight.

Pan Am and most other international carriers have adapted a system for pricing international flights developed by British Airways, Mann said. Panamac, Pan Am's reservation system, contains a Panafare component that can calculate 90% to 95% of Pan Am fares, he added.

Problems with adaptation

Mann said he believes American had difficulty developing software for pricing international flights because it tried to do so by adapting the current Sabre pricing program, which is based on the Automated Tariff and Fare Determination System (ATFDS) developed by Eastern Airlines and is geared to domestic fares.

"Pretty much around the world, people are doing [international fares] the way British Airways does. Pretty much no one is using ATFDS," Mann said.

Testing of the Sabre modifications for accommodating Pan Am continued through July. While the pricing problem was "the deciding issue" in ending the agreement, American's slow development of a link between the airlines' systems for controlling flight departures was also a factor, Mann said.

Illegal copying charged; 30,000 copies of DOS seized

BY ALAN J. RYAN
CW STAFF

SAN FRANCISCO — A U.S. marshal here seized 30,000 allegedly unauthorized copies of IBM's PC-DOS and evidence of the alleged illegal manufacture of Microsoft Corp.'s MS-DOS 3.3 after conducting raids on a printing shop and a computer dealer earlier this month.

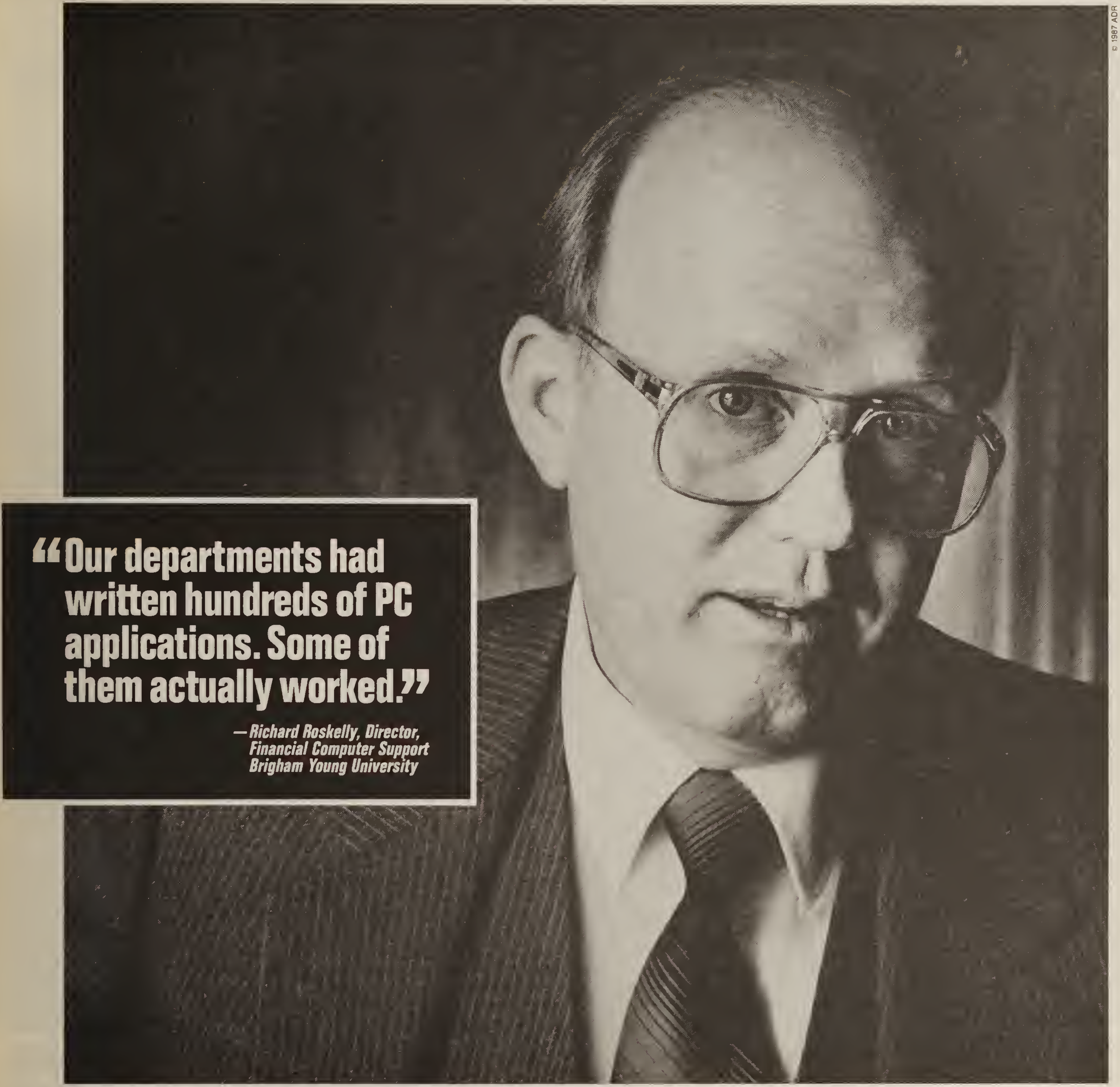
Microsoft filed a copyright infringement action in the Federal District Court for the Northern District of California July 29, after it discovered illegal copies of its product were entering the stream of commerce, according to Microsoft senior corporate attorney William Pope. The seizure order was authorized by Judge Samuel Conti, and the raids took place Aug. 3-6.

The U.S. marshal and two investigators hired by Microsoft seized the software, alleged illegal copies of documentation and printing materials from KK Graphics Printing, located here, and its owner, Richard K. H. Lin. When contacted at home last week, Lin declined comment.

KK Graphics Printing was "manufacturing MS-DOS 3.3 and, according to their business records, they manufactured at least 10,000 copies," Pope said. He said 30,000 allegedly unauthorized copies of PC-DOS in various stages of manufacture were confiscated in the raid.

An IBM spokesman said the company was assessing the reported seizures.

According to Microsoft, Lin testified that the operating systems software had been sold to Julius Liu and Kathy Liu, the proprietors of Beltron Berkeley, a computer storefront in El Cerrito, Calif.



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"Our departments had written hundreds of PC applications. Some of them actually worked."

—Richard Roskelly, Director,
Financial Computer Support
Brigham Young University

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Avanti to boost net management

Seeks to expand T1 sales with graphics, windows, multivendor connections

BY ELISABETH HORWITT
CW STAFF

Avanti Communications Corp. is expected next month to add two key missing ingredients to its network management offering: a centralized, graphics workstation-based system geared to the nontechnical end user and a connection to other vendors' network management environments.

Computerworld has learned Avanti plans to announce the Open Network Management System (ONMS) at the 1987 Tele-Communications Association conference. The system was designed to centralize reporting and diagnostic features that are currently distributed among Avanti T1 switches.

Based on a Sun Microsystems, Inc. Sun-3/110, the ONMS will provide color graphics, windowing, icons, network topology maps and other features designed to guide the inexperienced user through identifying and solving network problems, according to Avanti director of marketing Charles Halquist.

Once the user identifies a trouble spot, which appears color-coded on the screen, he can zoom down first to the specific box and then to the component board that is causing the trouble, Avanti said.

Could've clinched contract

If Avanti had been able to offer ONMS last year, it would have had a better chance to win a T1 networking equipment contract from the state of New Jersey, according to Michel Guite, a Salomon Brothers, Inc. vice-president who follows the T1 industry.

The state organization expressed its preference for Network Equipment Technologies Corp. and Digital Communications Associates, Inc. (DCA) equipment, Guite said, "because a blue collar worker could manage their networks, and that was the kind of operator they could get to run their systems at 3 a.m." The contract ultimately went to DCA.

According to estimates by Boston-based research firm The Yankee Group, Avanti held 8% of the T1 equipment market last year.

Avanti's introduction is expected to include a version of a multivendor network management system — another area in which Avanti's competitors have been active lately.

Initially, Avanti said, the company plans to announce its intentions to provide a terminal-to-host connection between ONMS and selected vendors' network management systems. With the connection, an alarm condition on a Paradyne Corp. system, for example, will show up automatically in a window on Avanti's ONMS. "The real issue is that users like to have one terminal, not 10, to monitor network problems," Halquist said.

Once the alarm condition is identified, the user will be able to run diagnostics and other applications, which will appear as one window on ONMS, as a terminal session on the other vendor's system.

Everybody's doing it

In the last few months, several T1 vendors have announced strategies for interfacing their network management systems with other companies' products. Most major T1 vendors, including Avanti, now support IBM's Netview/PC as a common format for sending network alerts to a data base.

In May, DCA promised multivendor support through the Open Systems Interconnect (OSI) standard. In June, Timeplex, Inc. announced it would provide low-level links between its Time/View system and other vendors' offerings and that it also planned to support some form of OSI.

Next month, Motorola, Inc. subsidiary Codex Corp. is expected to announce a network management system with an open, integrated architecture, the details of which have not been disclosed.

Avanti will officially announce its intentions to provide terminal connections to other vendors' network management systems but not which products it will initially support, Halquist said.

Other ONMS features to be introduced next month include trouble ticketing and collection of network traffic statistics, such as bandwidth usage and individual port activity. Users will be able to generate usage analysis reports using standard IBM Personal Computer programming language formats and mainframe-based programming languages, Avanti said.

ONMS will reportedly be priced at approximately $70,000.

Drip-dry

FROM PAGE 1

Comdisco customer Castle was one of those shops. "We had to run out and buy a pump," said Arthur Cybul, manager of DP operations at Castle, which is located in the western suburb of Franklin Park, Ill. "Our uninterruptible power supply system was flooded, and it didn't work, but, fortunately, the only hardware that was damaged were some communications controllers for terminals."

In any case, Cybul said, the company was fully insured for all hardware losses. Castle is a company that services metal parts, generating about $300 million in annual sales.

Cleaning up

Meanwhile, Castle's DP staff of 30 began to clean up, aided by dozens of other Castle employees. Pumps were started Friday, Aug. 14, and a team of six workers prepared to resume operations in a Comdisco hot site.

But when Castle management declared a disaster Saturday, Aug. 15, Comdisco's Chicago-area hot sites were filled by other customers from flooded data centers.

Comdisco was able to accommodate only two of its clients, both large IBM customers, at its three Chicago-area hot sites. Since one of the clients had prepaid for the rights to use two hot sites in the event of a disaster, the third Chicago client, Castle, was forced to fly to Comdisco's Carlstadt, N.J., hot site.

"Comdisco made it clear to us that the hot sites filled up on a first-come first-served basis," Cybul said, "so we weren't surprised. We knew they could accommodate us elsewhere.

"At first, we flew two people out to New Jersey with our backup files, which were kept in an off-site location in Illinois," Cybul explained. "By Saturday night, when we flew the rest of the team to Newark, N.J., the hot-site personnel were waiting for us."

At the hot site, Castle's applications, which had been running separately on the two IBM 4300s, were brought back up on a single-image IBM 3081. The 3081 also regenerated the company's data base, written under Applied Data Research, Inc.'s Datacom/DB. The data base, which tracks all inventory and the movement of company trucks, is essential to company operations.

It took eight hours to restore Castle's files to their predisaster condition. A full-blown IBM Systems Network Architecture network was regenerated from New Jersey Sunday morning, reaching 27 sites across the country that distribute Castle's metals products.

As of Friday, the network was still being run from the hot site, but Castle executives reportedly planned to resume operations at corporate headquarters this week. Last weekend was reserved for testing, which began Wednesday when the Franklin Park computers were powered up again.

Also providing disaster recovery services to Chicago-area businesses was Sungard Recovery Services, Inc., which is headquartered in Wayne, Pa. Sungard's clients did not face water damage, as Comdisco's had, but they did lack sufficient power and telephone service. One of them, a downtown financial services firm, only stayed at the hot site from Friday afternoon until 7 p.m. Saturday, Aug. 15.

After several hours without power, the financial firm flew its data, backup tapes and staff to a northern suburban airport. "They couldn't drive from downtown Chicago to our place," said John Ratliff, Sungard's vice-president of marketing.

Comdisco's clients were not as lucky. All three had flooded computer centers and will have to replace damaged equipment.

"It will take some amount of time, probably several weeks, before some of these users can get back into their flooded computer centers," Comdisco's Hipp said. "But they don't want to move to our cold sites and set up shop there. They want to get back home, because that's where their network is based."

WORLDWIDE PHOTO

Road to ruin: *Record rainfall that closed off Kennedy Expressway in Chicago also disrupted MIS operations.*

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M&D builds on PC platform

First in application series works with mainframe accounting packages

BY CHARLES BABCOCK
CW STAFF

CHICAGO — McCormack & Dodge Corp. unveiled last week the first of what it said will be a series of personal computer products that work with its mainframe accounting packages to provide distributed processing.

In addition, the Natick, Mass.-based firm used its 10th annual users conference here to announce a new report writer, Viewprint, that can combine information from multiple applications into one report.

The first two PC applications, labeled the Satellite series, will be General Ledger, or GL:Satellite, and Accounts Payable, or AP:Satellite. M&D said both are currently in beta-site testing and will be available Oct. 1. They will be priced on a graduated basis, depending on the number of PCs that use the software at a site. Prices will range from $12,500 to $35,000 for GL:Satellite and $17,500 to $60,000 for AP:Satellite, M&D officials said.

A beta-test user of AP:Satellite, Bill Musser, accounts payable manager at Weyerhaeuser Co. in Tacoma, Wash., said his firm is using the software to write checks at the plant level that need to be issued the same day, a procedure that was formerly executed manually. Weyerhaeuser's accounts payable departments issue about 50 manually executed checks a day, he said.

Account update

In addition, the 100 plants maintain open lines to the headquarters mainframe during most of the day in order to be able to update vendor accounts with which Weyerhaeuser does business. Musser's department incurs $10,000 to $12,000 in CICS chargebacks per week because of its need for constant communication with the host, a task that will be off-loaded to plant-level PCs through Satellite software.

"Now we will be able to upload to the host in batch mode at night," saving 70% to 75% of the department's CICS costs, Musser said.

"We will probably purchase the Satellite series. We have to close our accounts every single day and do it under strict time constraints. The general ledger software would take the burden off the mainframe and let us utilize our PCs," said Karen Bogosian, a technical analyst with Putnam Co. who viewed a demonstration of GL:Satellite at the users conference. Putnam is a Boston-based mutual fund investment company.

The series sparked the interest of other conference attendees, including Gary McDaniel, vice-president and controller of Commercial Bankers Life Insurance, a medium-size insurance company in Irvine, Calif. He said Commercial Bankers and other subsidiaries of Fremont General Corp. use M&D's mainframe accounting products, and those companies will be able to process data in common ways through the complementary PC-based products.

M&D officials emphasized that the Satellite series will not consist of stand-alone packages. Instead, the series represents functions in comparable mainframe and minicomputer packages that can be off-loaded to a PC, such as data entry and local data manipulation. When the tasks are completed at the PC, the data is intended to be uploaded into the larger system by M&D's PC Link.

Formatting function

In a similar vein, Kenneth Sawyer, an M&D marketing manager, said, data can be downloaded from the mainframe on PC Link into the PC packages. While it would be possible to transfer data without the link, it performs a formatting function between the two packages that would be difficult for an individual customer to duplicate, Sawyer said.

With the PC software, users can run reports and do calculations, journal entries and other accounting functions while disconnected from the mainframe. When the local tasks are completed, the uploading is then subject to the checks and controls of a batch process, Sawyer said. While on-line features may become part of the series in the future, Sawyer claimed M&D customers wanted batch processing capabilities first.

The Viewprint report writer, also introduced at the conference, is said to allow a user to assemble data from multiple applications and combine it in one report provided the applications are part of the Millennium family. M&D said programmers can use also facilities in Viewprint to create hooks into non-Millennium applications.

Viewprint is a detailed report writer for comparing budget or actual actual expense statements and listing high-volume transactions rather than a management information analysis tool, M&D's Michael Levinger said.

Scott Thomason, a programmer/analyst with Briggs & Stratton Corp. in Milwaukee, the only U.S. beta-test site of Viewprint, said the product "has an extract, sort and print methodology that allows you to do a report in one pass of the data base. Calculations can be performed at the extract or print stage."

Levinger said Viewprint will eventually replace application-specific report writers in M&D products. He acknowledged that speed of execution might be a concern in the beta-test version. "The logic to do cross-application extracts is quite complex," he noted.

Price shift

FROM PAGE 1

with lower prices afterward, I'd renegotiate, jumping up and down. I'd do what I could to recoup my dollars."

"If vendors are going to use this pricing to reduce the cost of entry-level systems, there's some benefit," said John Owens, executive vice-president and director of electronic data processing services at Shearson Lehman Brothers, Inc. But, he added, "If it increases prices for large shops, well, there's no benefit there."

Pricing policies

Other vendors report that a tiered pricing policy is under review. Pansophic Systems, Inc., for example, will probably institute new pricing within four to six months, according to David Eskra, chairman and chief executive officer.

Of nine software companies contacted by *Computerworld* last week, only one, Management Science America, Inc. (MSA), said it had no plans to revise its pricing strategy.

"Most of the ones that are doing it are systems software vendors," said John Imlay, chairman of MSA. "They have to do it because they compete directly with IBM. We don't, with application software."

However, Cullinet has moved to reprice in the applications area as well, establishing its tiered pricing policy "across the board," according to Papows. The Westwood, Mass.-based company will use a four-tiered structure for its data base products that corresponds with the IBM method.

IBM designated four groups for its 370 series processors last year and now bases software pricing on processor group. The four segments begin with Group 10, made up of IBM's low-end mainframes, including small 9370s. The tier tops off with Group 40, which includes IBM's 3090 series mainframes. For its financial and manufacturing applications, Cullinet said it will use a three-tiered system that is similar to the IBM model but combines Groups 30 and 40 into one unit.

Applications software vendor McCormack & Dodge Corp. is on the fence regarding graduated pricing. "I wouldn't say we're planning to, but we're studying the hell out of it," said Robert Kelley, corporate vice-president of strategic marketing. "Obviously, if Cullinet and MSA do it, we will have to do it."

At least two vendors are implementing graduated pricing in phases. ADR announced last week that it will provide 9370 pricing in September that is based on IBM's Group 10 and 20 pricing. ADR will follow next year with additional tiers for larger 370 series processors, according to William Clifford, ADR's executive vice-president.

On-Line Software said it will also introduce 9370 pricing next month. It has set up three 9370 price levels for its software products that run under IBM's VM operating system. In addition to low- and high-end 9370 prices, it has a separate price for IBM VM/XA users.

The changes will probably mean confusion to customers in the upcoming months, as vendors decide what will happen to existing policies such as site licensing and discounting in regard to the graduated structure.

Cincom, for example, has been selling software based on the number of users a system will support. It said it will retain this structure and add the IBM four-tiered hardware structure when it rolls out its price list in October.

The result will be that within the four groups there will be four different categories: unlimited users, up to 64 users, up to 32 users and up to 16 users.

Problem policies

Other vendors have used site licensing policies, which became a problem with the 9370.

ADR has traditionally sold software without regard to processor size, basing price on the operating system under which the software would run. With the old method, the company has a site licensing policy that allows customers to pay once for a software program that would run on multiple CPUs.

With its revised 9370 pricing, ADR will charge on a per-CPU basis for new customers or for current customers who will use a different operating system on the 9370 than the one they used on their other IBM mainframes.

A VM shop that installs 9370s also running VM would be able to run ADR software on the departmental systems at no extra cost, Clifford said. He said ADR has not yet decided how it will handle users who are currently under site licenses with larger processors.

Tipping the scales

Independent vendors are adopting IBM's graduated pricing scheme

	ADR Datacom/DB	Software AG Adabas	Cullinet IDMS/R
Previous	$145,900 (MVS) $114,500 (VM or VSE)	$178,000 (MVS) $142,000 (VM)	$90,000 (4300 series) $180,000 (3080,3090 series)
*Group 10**	$17,175 (VM or VSE)	$30,000 (VM)	*
Group 20	$51,065 (MVS) $40,075 (VM or VSE)	$150,000 (MVS) $53,000 (VM)	$125,000
Group 30	Not announced	$170,000 (MVS) $113,000 (VM)	$135,000
Group 40	Not announced	$190,000 (MVS) $113,000 (VM)	$180,000

*MVS not available on Group 10 9370 models

CW CHART

Cullinet loses general ledger rights

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — After losing a three-year court battle with McCormack & Dodge Corp., Cullinet Software, Inc. said last week it will internationally market a general ledger product that is different from the one it markets in the U.S.

The Massachusetts Supreme Court ruled last week that Cullinet did not obtain the right to market internationally a product it licensed from M&D six years ago.

Cullinet announced a year ago that it had acquired an additional general ledger product, which it calls the Cullinet International General Ledger System, from a European source.

Not disclosing the name of the source was included in the terms of the acquisition, Cullinet spokesman John Moriarity said.

Not unique

Jeffrey P. Papows, Cullinet's vice-president of marketing, said the ability to consolidate data from different general ledger systems is common in the industry rather than unique to the two Cullinet products.

"You could take Software International, Inc.'s [now part of Computer Associates International, Inc.'s application division] or Management Science America's [packages] and do the same thing," Papows said.

General Electric Co., the former owner of Software International and a user of its Masterpiece accounting software, uses several other general ledger products throughout the company, Papows said. Papows is a former executive at Software International.

According to Papows, the Supreme Court decision will not prompt any major change at Cullinet because the company refrained from marketing the M&D product overseas until the dispute between the two companies was decided.

Offering differing packages in the domestic and international markets will not lead to incompatible accounting entries for multinational customers, according to Cullinet representatives.

A multinational company can use both products and still consolidate worldwide accounts, Papows said.

Cullinet's interpretation of the $1 million-plus licensing agreement with M&D was that Cullinet was restricted to marketing the product in the U.S. and Canada for five years, after which it could market the product internationally.

M&D disputed that interpretation, and the two companies went to the Massachusetts Superior Court in 1984.

CORRECTIONS

Forecross Corp. was not acquired by On-Line Software International, Inc., although On-Line acquired rights to several of that company's products. Forecross's name was misspelled in an article referring to some new On-Line products [CW, Aug. 3].

Digital Equipment Corp. cut the price of a 32M-byte VAX 8530 system from $347,000 to $342,000 [CW, Aug. 17].

Data General Corp.'s MV/7800 XP and MV/7800 DCX [CW, Aug. 17] use 256K-bit memory chips.

Omitted from the July 27 Spotlight on graphics workstations were five products from Autodesk, Inc.: Autocad, a general-purpose open-architecture design and drafting package featuring an integrated high-level programming language; Autocad AEC Architectural for architecture and construction applications; Autocad AEC Mechanical for mechanical engineering; Autosketch, an entry-level architectural design program; and The Engineer Works, an Autocad interface that supports three-dimensional solid modeling for mechanical and architectural applications.

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Low-end PS/2 gets stepladder

Pair of hard disk drive intros from third parties add muscle to Model 25

BY JAMES A. MARTIN
CW STAFF

Hoping that corporate MIS managers will take some interest in the IBM Personal System/2 Model 25, two add-on product vendors are offering hard disk drives for IBM's low-end microcomputer to expand that system's role beyond home and education applications.

Western Digital Corp. is expected to announce early next month the PS2520I, a 20M-byte hard disk drive kit that fits into the 3½-in. form factor slot underneath the PS/2 Model 25's microfloppy disk drive. The kit reportedly includes an internal controller board that absorbs one of the Model 25's two expansion slots.

Western Digital, based in Irvine, Calif., already announced the Filecard PS-30, an add-in card with a 30M-byte hard disk drive and controller for the PS/2 Model 30. The Filecard uses 1½ Model 30 expansion slots and was physically too cumbersome to fit into the tightly packaged Model 25, according to Linda Robinson, program manager for the Filecard.

In addition, Plus Development Corp. said last week that its Hardcard 40, a 40M-byte hard disk drive and controller on one expansion board, is compatible with the Model 25 as well as the Model 30.

Hardcard 20, a 20M-byte hard disk drive and controller board released in 1985, can be used in both models with the help of an upgrade kit.

Viable workstation

Although the Model 25 is strongly positioned for the home and education markets, a spokesman for Plus said that with a hard disk, the Model 25 becomes a viable low-end workstation for stand-alone processing or network terminal applications within a corporate environment.

Plus's 20M-byte hard-disk board "brings performance to the Model 25 that exceeds [the performance of] the Model 30 configured with a 20M-byte drive," said Hank Chesebrough, manager of product marketing.

However, analysts and users said they are not convinced that the Model 25, with or without a hard disk, could compete against the Model 30 or IBM Personal Computers and compatibles.

'Too many disadvantages'

"The Model 25 might be appropriate for a tiny business that doesn't need to communicate with a mainframe, but otherwise, there are too many disadvantages in speed, upgrading options and memory size," said Joe Cross, an analyst with Future Computing/Datapro in Dallas.

Although the Model 25's $1,350 retail price is considerably less than the Model 30's $2,295 tag, the Model 30 has been subject to deep discounting almost since its introduction. It can be purchased in some markets for slightly more than $1,000 and is, therefore, the better buy, according to Richard Shaffer, editor and publisher of "Computer Letter," an industry newsletter based in New York.

"As a dumb terminal of sorts or as a computer for PC training, when you don't need the expandability, the Model 25 should do OK in a business environment," said Richard Murphy, manager of Suntrust Banks, Inc.'s microcomputer division in Orlando, Fla. "Otherwise, even with a hard disk, I don't think it would really serve a strong purpose."

The Western Digital hard disk drive kit is set to begin shipping Sept. 4. Pricing has not been announced.

The Hardcard 20 upgrade kit costs $50 to users who purchased the board before Aug. 1 and is free to those who purchased it after that date, the company said.

Lockheed puts factory under Ethernet umbrella

BY KATHY CHIN LEONG
CW STAFF

SUNNYVALE, Calif. — Lockheed Missiles & Space Co. last week unveiled its Automated Center for Electronics (ACE), a $41 million manufacturing site that integrates more than 200 computerized devices under one baseband Ethernet network.

The company chose not to use the much-touted Manufacturing Automation Protocol (MAP) for its networking standard. Bob Fitzpatrick, chief systems engineer for ACE, said the company preferred to remain with Ethernet since Lockheed was already using Decnet, Digital Equipment Corp.'s version of Ethernet, in the engineering group. "By the time we started working out the details for the facility, MAP was not fully mature. We already had an installed Ethernet, and it wouldn't make sense to change," Fitzpatrick said.

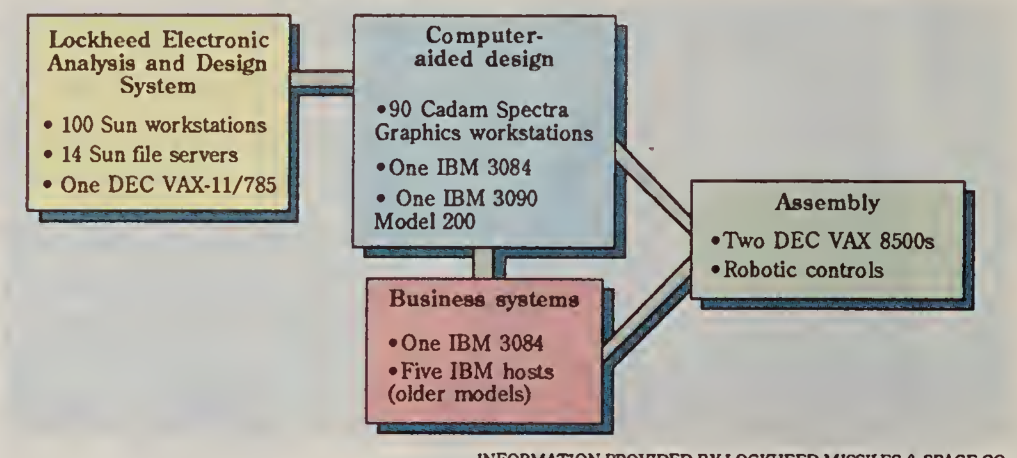
That practical approach may also be the most prosperous for Lockheed. Anthony Friscia, president of Advanced Manufacturing Research, a Salem, Mass.-based consulting firm, noted that too many companies are concerned with using the latest and most popular technologies before planning exactly what they want to accomplish. He said successfully managing the automation process is the key to manufacturing success.

Locking horns

The issue of MAP vs. Decnet has been a topic of contention for the past several months, with DEC President Ken Olsen publicly deriding users groups' efforts to set standards and the decision by MAP proponents not to consider Decnet's medium as an alternative to MAP-endorsed broadband. MAP enthusiasts, led by DEC customer General Motors Corp., have long argued that Ethernet is prone to signal interference; that the contention-based access scheme will bog down the network as traffic increases since data collisions will increase; and that baseband networks are less flexible for long distances and cannot support a mixture of voice, data and video, for example.

ACE on the floor

Lockheed's ACE network links a variety of devices in a factory environment over DEC's version of Ethernet



INFORMATION PROVIDED BY LOCKHEED MISSILES & SPACE CO.
CW CHART

But Lockheed's Fitzpatrick maintained that his team of specialists has already tackled those issues. Heavy, shielded baseband cable has been installed in the noisiest areas of the site. To lessen the volume of data collision on the network, engineers have worked with DEC to partition the network into "subnetworks," he said.

And, while broadband can support single network lengths of up to 25 miles and baseband cannot, Fitzpatrick said that does not matter. Lockheed's Ethernet network will be limited to the ACE and an adjacent Lockheed micro electronics facility.

The company has no intention of using video or voice on the factory floor network. "We looked at all the options and completed many feasibility studies," Fitzpatrick said. "Decnet is sufficient to meet all our needs for now and the future."

Under development for years, the 231,000-sq-ft facility will be the first to offer end-to-end production of printed-circuit boards for military defense systems, Lockheed officials said. According to Howard Wolnowsky, director of Lockheed's data exploitation programs, these boards will be made in a "nearly paperless environment" from design to the final assembly.

Quicker and cheaper

When fully operational in September, the site will be able to produce boards faster, cheaper and with higher reliability, Wolnowsky said. A 15- by 15-in. circuit board that would have taken eight hours to produce will now take seven minutes, he said. The same board will also cost the company 40% less to assemble. And that advantage has already given Lockheed the green light to bid for contracts at lower prices. In fact, Lockheed already has a space customer lined up for the ACE site.

Experts monitoring the manufacturing communications market are lauding Lockheed's plan. "I would put them in the upper 1% among American manufacturers," Friscia said. "Others have tried to do this and failed. What is important is to show that this works. It doesn't matter if they are the first or second or third. There are just not too many success stories out there."

The creation of the new site stemmed from the company's realization that state-of-the-art aircraft and missiles were increasingly reliant on computerized and electronic controls. In addition, the company said it expects sales of electronic components and related software to make up half of its revenue in 1991.

With those reasons in mind, Wolnowsky said the strategic need for a networked facility with a full complement of hardware and internally developed software was critical. Prior to this, engineers in various groups were using computers with a variety of protocols, Wolnowsky explained. "Specifications were passed manually from group to group, and redundant key entry was everywhere."

Although the ACE site is producing boards at a faster rate, Minouru Araki, president of Lockheed's Space Systems Division, stressed that the focus will be on quality production. "The goal is not high-volume production," he said. "We want to ensure [that] each customer gets custom electronic components from our division."

By February 1988, the adjacent facility, called the Micro Electronic Center, is scheduled to be completed for the development of very large-scale integration circuits, Wolnowsky said.

From start to finish

Leading a tour of the facility, ACE officials outlined the manufacturing process from start to finish.

In the Lockheed Electronics Analysis and Design System area, engineers are creating the initial specifications on 100 Sun Microsystems, Inc. workstations linked to one DEC VAX-11/785. From there, specifications are sent to Cadam, Inc. Spectra Graphics workstations in the computer-aided design area for another set of engineers to create board layouts.

A business systems network of IBM mainframes is interfaced to the Ethernet network, giving the assembly line shop orders and production duties. Finally, the boards go from the computer to actual production in the assembly area, where rows of robotic arms stuff the boards with the components.

According to Wolnowsky, reliability is improved since users at any point on the network can check the original board design to make sure the product has not strayed too far from its intended specifications. At every turn of the process, the system software makes a series of quality checks. So exacting is the process that the company intends to bypass building prototype boards and go directly into final manufacturing.

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Speeded up Word adds macro ability

BY ALAN J. RYAN
CW STAFF

REDMOND, Wash. — Microsoft Corp. is scheduled to announce today an upgraded Microsoft Word software program and said last week it expects the changes to increase the company's penetration into large and small businesses.

Word 4.0 is targeted mainly at secretaries, managers and attorneys, according to Lewis Levin, Microsoft's product manager for applications marketing.

This latest version features increased speed, the ability to use macro commands and document management and retrieval. "Document retrieval is a total drop-dead secretarial requirement," Levin said. Other changes have been made as well — many at the request of users.

To reach the target audience, Levin said, "we needed to make some improvements for people who wanted to do word processing."

So Microsoft went to its users to see what features they wanted and needed most. Included in the improvements is a streamlined user interface to make the product more intuitive. "That was in response to some criticism we'd gotten," especially about cursor commands, Levin said.

Today's lesson

Other changes are an integrated on-line Help tutorial that presents a lesson on the topic in use without leaving the document and a "red-lining" feature for highlighting changes to copy or adding comments while leaving the original intact if the author chooses not to incorporate those changes, Levin said.

The cursor in Microsoft Word 4.0 reportedly moves 90% faster than in previous versions, but it can be slowed down if the user does not desire the speed.

Word 4.0 is scheduled to ship next month and to retail for $450 for new users. Those who purchased Version 3.1 after July 1 will get the upgrade free of charge; versions purchased prior to July 1 can be upgraded for $75.

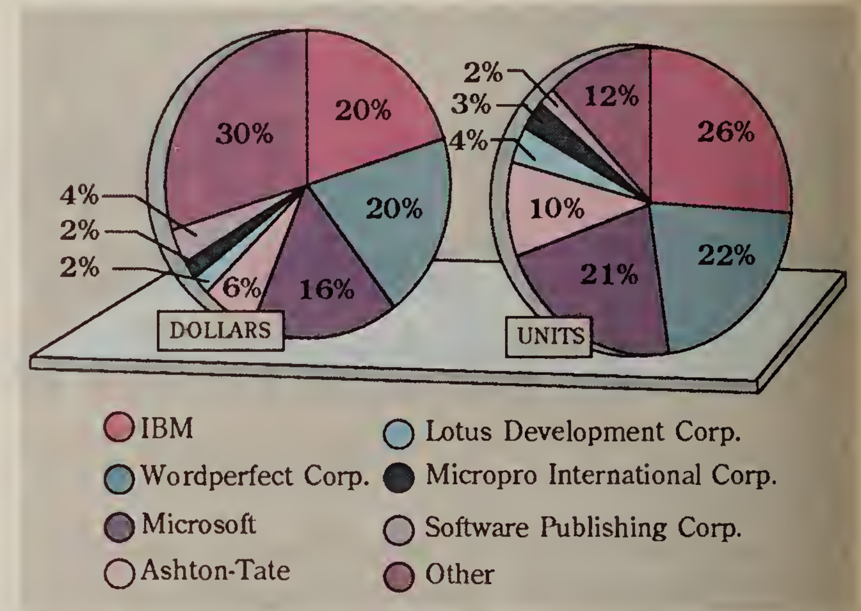
The networked version is expected out about six weeks after the first shipments of Word 4.0, Levin said.

For $750, the user will get Master Pack, which supports IBM's Token-Ring network and PC Network; AT&T's Starlan; Ungermann-Bass, Inc.'s Net/One; Novell, Inc.'s Advanced Netware and 3Com Corp.'s 3+ and Ether series as well as any other networking package compatible with Microsoft's MS-Net.

For each additional user, the fee is $150, which includes the workstation user manual, documentation and a license to get into the server copy.

Word power

Microsoft already holds a substantial share of the $42 million PC word processing market



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Enmasse resurrected, to buy Point 4 Data

BY STANLEY GIBSON
CW STAFF

TUSTIN, Calif. — Point 4 Data Corp. recently announced that it has received an offer to be acquired by Enmasse Computer Corp. for $18.7 million.

Enmasse, formerly located in Acton, Mass., ceased operations early this year. However, its investors are now seeking to marry Point 4 with the remaining Enmasse technology in the belief that Point 4 will attain the marketing success that eluded Enmasse.

According to former Enmasse President Robert Gardner, Enmasse's investors denied the company $5 million in February, causing the young firm to shut down. Enmasse's investors include Oak Investment Partners in Westport, Conn., which is also an investor in Point 4.

Enmasse produced a Unix-based transaction processing system that it was unsuccessful in selling to large corporations or to value-added resellers (VAR). The company claimed its system could be expanded by adding tightly and loosely coupled units to a maximum size that could handle 2,500 users and provide 200 million instructions per second.

One-man gang

The current president and sole employee of Enmasse is Robert Baker, who is also president of Technology Service Group, Inc. in Melbourne, Fla. Enmasse has sold all of its hardware, Baker said, and retains only its software and hardware specifications. Baker said he was retained as a consultant by Oak Investment to explore how to best turn a profit from Enmasse's technology.

Oak Investment is also an investor in Technology Service. Baker said Technology Service is being paid a fee by Enmasse investors for his services.

Enmasse has neither declared bankruptcy nor paid off all its creditors, Baker said. The company hopes to gain revenue from its relationship with Point 4 in order to pay off its debts, although Enmasse's creditors have not yet been informed of the proposed merger, Baker said.

After the proposed transaction, William Rigby, Point 4 president and chief executive officer, will become president of Enmasse, which will act as a holding company.

Rigby will remain president and CEO of Point 4.

Under the plan, Point 4 said it will become a wholly owned subsidiary of Enmasse and will retain its name, management, products and policies. Point 4 management and its board of directors are recommending acceptance of the Enmasse offer to Point 4 shareholders, according to a prepared statement issued by Point 4.

"We are going to look at the [Enmasse] technology and repackage it for a profitable market," Rigby said, although he declined to say in what form he would put the technology or to which market he would try to sell it. "We won't market the Enmasse product right away," he added. Point 4 licenses the Iris operating system and sells transaction processing systems to VARs of small and medium-size businesses.

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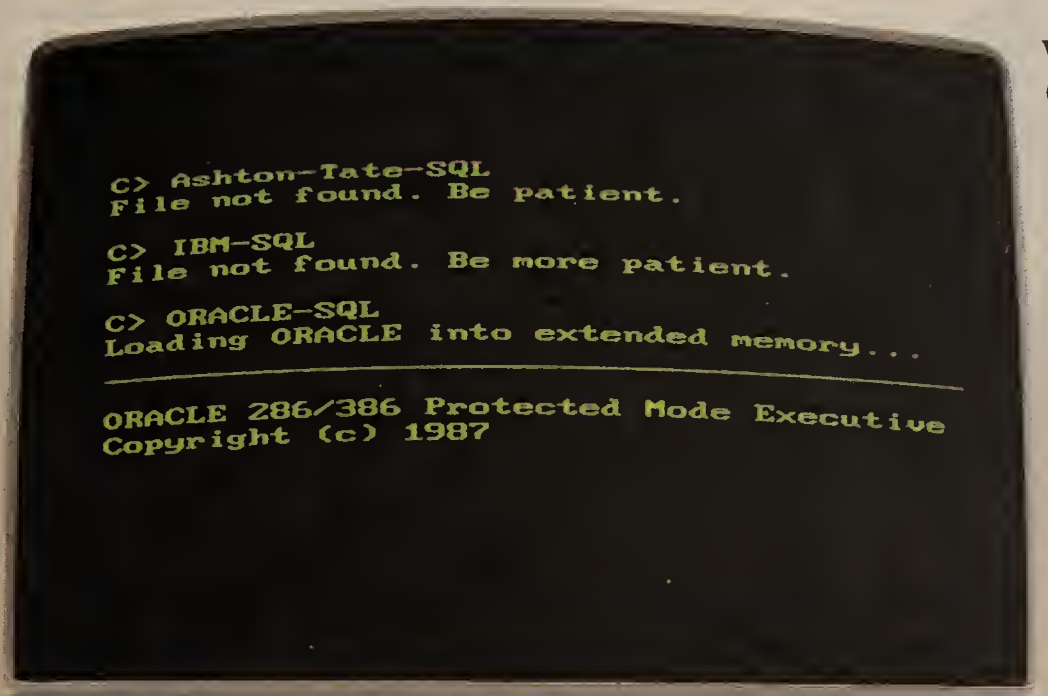

```
C> Ashton-Tate-SQL
File not found. Be patient.

C> IBM-SQL
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C> ORACLE-SQL
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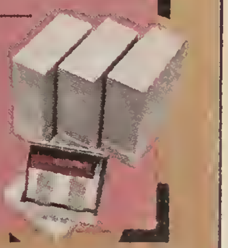

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*PC ORACLE requires an "OS/2 ready" 286/386-based PC running DOS 3.1+ with 1MB extended memory (2MB is recommended) and a minimum 10MB hard disk drive.

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TRBA

HP, Tandy, Ashton-Tate pick up steam

BY CLINTON WILDER
and STEPHEN JONES
CW STAFF

The computer industry continued to show strength in several sectors last week as solid quarterly earnings growth was reported by Hewlett-Packard Co., Tandy Corp. and Ashton-Tate. But Cullinet Software, Inc., still in a transitional phase, reported its fifth straight quarterly loss.

Ashton-Tate posted strong revenue and earnings growth despite speculation that competition from IBM, which will reportedly include a data base in its OS/2 Extended Edition, would leave Ashton-Tate's popular Dbase III out in the cold.

Users apparently were not scared off by the pending IBM announcement. Dbase III sales accounted for about $41 million of Ashton-Tate's $63.6 million in revenue for the second quarter ended July 31.

Mixed reaction

Net income rose 55% from the corresponding quarter last year, from $6.5 million to $10 million, or 40 cents per share. Revenue was up 30% from the $49 million posted in the second quarter of 1986. But Wall Street was less impressed with the vendor's sequential quarterly revenue growth, which rose by just more than $3 million.

Bruce Johnston, an analyst with First Boston Corp. in New York, said Ashton-Tate came in at about $3 million less than his prediction of $67 million for second-quarter revenue.

He attributed the lower number to flat sales for Ashton-Tate's Multimate upgrades. Instead of taking off, Johnston said, sales from word processing packages grew by only about $400,000, from $11 million for the quarter ended April 30 to $11.4 million last quarter.

HP reported one of its better growth quarters in recent years. The Palo Alto, Calif.-based minicomputer and scientific instruments maker said third-quarter profits increased 20% from year-earlier levels to $148 million, or 57 cents per share. Revenue was up 14% to $2 billion.

HP President and Chief Executive Officer John Young said in a prepared statement that the firm's order backlog rose by $200 million during the quarter. He said the company's fourth-quarter goal is to convert that backlog into shipments.

Ups and downs

Westwood, Mass.-based Cullinet reported a loss of $8 million, or 25 cents per share, nearly double its $4.4 million operating loss in the year-earlier quarter. But sales jumped 48% to $49 million, compared with $33.2 million in the first fiscal quarter a year ago.

Cullinet lost a total of $11.4 million, or 36 cents per share, in the comparable quarter of 1986, but that figure included a $7 million charge.

Although Cullinet's sales reached a record high for the first quarter, Scott Smith, an analyst with Donaldson, Lufkin & Jenrette, attributed them to revenue from software maintenance rather than product licenses. He said maintenance revenue grew by 65% to surpass revenue from licenses, a highly unusual situation for Cullinet.

"It's a difficult time for Cullinet, as they try to introduce many new products and cut expenses," Smith said. "They will have difficulty stimulating any growth in the mainframe data base market." He estimated that Cullinet will remain in the red for at least two more quarters.

Like other leading microcomputer suppliers such as Compaq Computer Corp. and Apple, Tandy reported strong quarterly and year-end financial results. In the quarter ended June 30, profits rose 66% to $44.4 million, or 49 cents per share, on a modest revenue gain of 7% to $736.6 million.

For the year, the Fort Worth, Texas-based firm said its profits increased by 23% to $242.3 million and that sales grew 14% to $3.45 billion.

PS/2 to get 3½-in. HAL

CAMBRIDGE, Mass. — Lotus Development Corp. last week announced it will immediately begin shipping a 3½-in. version of its Human Access Language (HAL) for the IBM Personal System/2.

HAL is a collection of shortcuts from Lotus's 1-2-3 program that makes it easier to perform tasks such as entering formulas, formatting worksheets, moving and copying data, extracting data, creating graphs and sorting data bases, according to Lotus.

The product takes advantage of the features of Microsoft Corp.'s MS- and IBM's PC-DOS 3.3, new data storage devices and the video displays of the IBM PS/2, Lotus claimed.

Registered users of the 5¼-in. disk version of HAL will be allowed to migrate to the 3½-in. version. That program reportedly will begin in the fourth quarter and carry a $30 fee.

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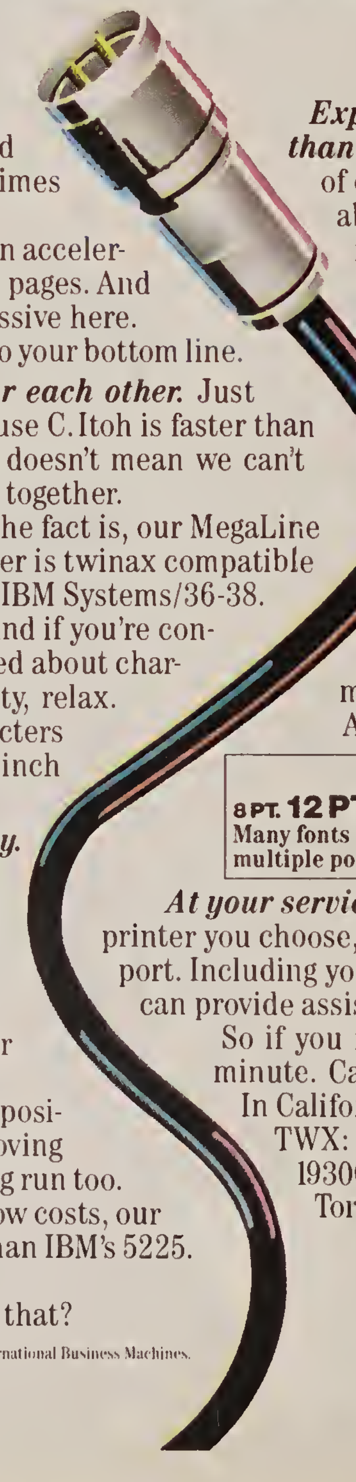

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Zenith Data president leaves for start-up

Dilworth leaves for Metricom; Senior VP Frank named replacement

BY CLINTON WILDER
CW STAFF

GLENVIEW, Ill. — Zenith Data Systems President Robert Dilworth, who guided the firm to its status as one of the top three IBM Personal Computer-compatible vendors, resigned last week to head a Silicon Valley start-up.

Dilworth will become president of Metricom, Inc., a Cupertino, Calif.-based firm that is developing remote meter-reading and control systems technology for the electric utility industry. His new position will take effect Sept. 1.

Named to replace Dilworth at Zenith was John Frank, 48, Zenith's senior vice-president of sales and marketing. Frank joined Zenith in 1981 from a sales position at Management Assistance, Inc.

Frank said Dilworth's departure was not a surprise and that its timing was not related to Zenith's recent winning of a $104.5 million contract to supply laptop computers to the Pentagon [CW, Aug. 17].

Free spirit

"Bob has always been an entrepreneurial spirit and never made any bones about it," Frank said. "This was the kind of opportunity he has been looking for. We expect a real smooth transition."

A keynote speaker at Comdex/Spring '87, Dilworth is a California native who maintained a residence in Scotts Valley during his two years at Zenith, according to Metricom Chairman Paul Barron. Metricom, incorporated in December 1985, is a venture capital-backed company employing 22 people.

The move will mean a drastic organizational change for Dilworth, who joined Zenith from Morrow Designs, Inc., the firm that licensed its portable microcomputer technology to Zenith.

A wholly owned subsidiary of Zenith Electronics, Inc., Zenith Data Systems reported revenue of $550 million last year and is growing at a 100% rate this year, a Zenith spokesman said.

Zenith made its name selling IBM PC compatibles to the federal government and education markets.

It won several high-priced government contracts during Dilworth's tenure, including the 1986 Internal Revenue Service laptop bid and the recent $104.5 million pact for 90,000 laptops for the armed forces.

Because Metricom is not in the computer business directly, Dilworth will be available as a Zenith consultant until the end of the year.

Art Lambert, formerly vice-president of sales, was named to replace Frank, and national sales director Jack Cullen replaced Lambert.

First Financial to pay $65M for Endata

ATLANTA — First Financial Management Corp., a leading data processing service bureau for banks and thrift institutions, last week announced its intention to acquire Endata, Inc. for approximately $65 million in cash and stock.

First Financial Management is a major customer of Endata, a Nashville-based firm that transfers data stored on computer disks and tapes onto microfiche. Endata has an annual revenue of approximately $40 million, and First Financial Management does about $110 million in business annually.

The buy-out closely mirrors one made earlier this year by a major First Financial Management competitor, MTech Corp., according to Cato Carpenter, an analyst with Baltimore-based Alex Brown & Sons, Inc.

Dallas-based MTech purchased Kalvar, Inc., which supplied microfiche services in two of MTech's 20 data centers. After finalizing the acquisition, MTech plans to expand the Kalvar service to all of its centers.

"My hunch is that First Financial saw that deal and saw that it made sense," Carpenter said.

Banks and financial institutions are required to keep customer account records and other data on microfiche for varying periods of time. First Financial operates 36 DP centers accessing 87 mainframes for approximately 1,000 customers.

After completion of the merger, Endata Chairman and Chief Executive Officer Douglas C. Altenbern, a former chairman of ADAPSO, will become vice-chairman of First Financial Management.

The final price of the acquisition will be between $60.6 million and $73.6 million, depending on the average First Financial Management stock price in a specified period. First Financial will fund 20% of the buy-out in cash and 80% in newly issued shares. The transaction is expected to be completed in October.

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Pageperfect sets final October delivery goal

BY STEPHEN JONES
CW STAFF

SAN RAFAEL, Calif. — After almost one year of delays, International Microcomputer Software, Inc. last week said it will start shipping a $495 desktop publishing package with a fully integrated word processor by early October.

The company claimed Pageperfect will be the first product to merge desktop publishing, full-function word processing and file management into one program. Unlike the spate of economy-minded packages released recently for the low end of the desktop publishing market, Pageperfect requires expensive hardware and a large amount of memory.

Jill Lifschiz, manager of marketing for the software publishing house, said the hybrid product will be released no later than the second week in October.

The package was designed to run on machines based on Intel Corp.'s 80286 and 80386 microprocessors and needs 640K bytes of random-access memory. It also uses IBM's Enhanced Graphics Adapter.

Those requirements put Pageperfect in the middle of today's desktop publishing spectrum — between Software Publishing Corp.'s $249 PFS:Professional Write Plus and Xerox Corp.'s $895 Ventura Publisher.

Evading desktop publishing fray

But International Microcomputer President Richard Borenstein said the product will not be positioned as a traditional desktop publishing product. Instead, he said, the firm will promote the product as an easy-to-use word processing package that can dress up standard business communications such as letters, memos, news releases and reports.

Pageperfect features a file management operating shell that is said to enable the user to move through document creation, graphics integration, layout and printing without exiting the program.

The package allows users to enter and edit text within a composed page at nine different view levels with what-you-see-is-what-you-get capabilities. It is bundled with a high-performance graphics editor called Desktop Publisher's Graphics.

"It's not the ultimate desktop publishing program, but it has good typesetting functionality, nice built-in graphics, and it's very easy to use," said Peter Dyson, editor of "The Seybold Report on Desktop Publishing," who saw a demonstration of Pageperfect last spring.

The package automatically accepts files from other word processing packages, such as Micropro International Corp.'s Wordstar and Ashton-Tate's Multimate, and it features a spell checker and a thesaurus.

First scheduled for release in November 1986, Pageperfect has hit a number of development obstacles, and early runs of the product might still contain some bugs, sources said.

Borenstein said the initial version of Pageperfect will not be compatible with Adobe Systems, Inc.'s Postscript and that its output capabilities will thus be limited to laser printers from Hewlett-Packard Co. and Canon U.S.A., Inc. Borenstein, however, emphasized that Postscript compatibility will be available by January.

But that concerns industry watchers like Dyson, who said lack of integration with standard products could make Pageperfect little more than a niche offering.

"If Pageperfect is going to be perceived as a desktop publishing solution, then [International Microcomputer] is going to have to come out with a Postscript driver at some point," Dyson said.

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Amdahl makes first super sale

Three-year wait ends as oil-search firm buys vector processor

BY JEFFRY BEELER
CW STAFF

HOUSTON — For Amdahl Corp., the long wait has ended at last. Nearly three years after the company entered the supercomputer field with considerable fanfare, a domestic user has finally agreed to buy one of Amdahl's four models of IBM-compatible vector processors.

The first U.S. customer of an Amdahl supercomputer is GECO Geophysical Co., the U.S. affiliate of Geophysical Co. in Norway. GECO said it plans to use its Model 1100 number cruncher, which it installed Aug. 8-9, to aid its clients in the search for untapped deposits of crude oil.

Installation of the Model 1100 at the contractor's U.S. processing center here came more than 34 months after the machine and a companion system, the Model 1200, were introduced at Amdahl's Sunnyvale, Calif., headquarters in September 1984. Since then, the IBM-compatible mainframe vendor has announced two additions to its supercomputer family, which now ranges in performance from 143 million to 1.14 billion floating-point operations per second (FLOPS).

Importing success

At the same time, Amdahl and its West Germany-based business partner, Siemens AG, together installed a total of 10 of Amdahl's vector processors at various customer sites in Europe. But it was not until the 267-MFLOPS Model 1100 — which corresponds with Fujitsu Ltd.'s VP 100 supercomputer — replaced GECO's existing Amdahl 5860 that Amdahl began to duplicate its European sales success in the U.S. The vendor attributed the delay in domestic sales to a fundamental difference between the American and European supercomputer markets.

"The U.S. vector processing arena was extremely hard for us to crack, because it's Cray's home turf, the place where they're most deeply entrenched," said Wayne McIntyre, Amdahl's director of scientific systems. "In Europe, where loyalty to one dominant vendor is somewhat weaker, the market is a bit more of a free-for-all."

Another reason the company's supercomputer line remained unpopular in the U.S. for so long has to do with an admitted lack of clarity in its initial marketing efforts. "When we started, we adopted a bit of a shotgun approach, and it took us a while to figure out which applications our vector processors are best suited to," an Amdahl spokesman said.

The firm identified the petroleum and seismic services industry as a business opportunity that "fits our supercomputers to a tee," McIntyre said. "What almost every player in that sector has in common is a lot of experience in scientific computing and a nearly complete dedication to IBM 370-style mainframes."

"As a geophysical contractor, we acquire and process seismic data for oil companies, both large and small," said Randall Odom, GECO's vice-president of data processing. "Through an air gun or some other device, we shoot energy into the ground, then listen to the signals the underlying layers of rock send back to us."

By sampling the returning energy waves every 2 msec for 8 to 15 seconds, geophysicists can record a series of "wiggle traces" that indicate precisely how the earth is structured at a particular point beneath its surface. They can then interpret the highly technical data to derive whether the section of rock in question looks promising enough to warrant exploratory drilling for oil.

Although the procedure sounds simple, it demands far more computation power to eliminate extraneous noises and otherwise process the incoming seismic data than GECO's existing combination of an Amdahl 5860 and three 470V/8s can deliver, Odom said.

So about two years ago, the contractor's parent company in Stavanger, Norway, benchmarked three systems as potential substitutes for the 5860 scalar mainframe. The test subjects included the Model 1100, a Cray Research, Inc. supercomputer and an IBM 3090 with a vector processor attachment.

Cray didn't do it for GECO

Although the Cray machine took top honors from the standpoint of sheer speed, it proved unsuitable for GECO's application. "It lacked a sufficient amount of main memory to handle and manipulate the long records we have to deal with when we process our seismic data," Odom said.

Moreover, the IBM candidate proved more expensive than the Model 1100 when the price of the 3090's vector processor attachment was figured into the overall cost equation, he added. So by a process of elimination, GECO's parent organization opted eventually for the Amdahl alternative, which holds up to 256M bytes of internal storage and is currently configured with 128M bytes.

Like GECO, most large oil companies and geophysical contractors run lots of Fortran code which, if vectorized and recompiled, can be readily transported from the scalar mainframes where they currently reside to IBM-compatible supercomputers such as Amdahl's.

But no sooner had Amdahl targeted the petroleum industry as a prime market than the price of crude oil plunged to nearly $10 per barrel. The decline put oil companies in a severe financial bind and forced most of them to slash their spending for research and development, including supercomputers, McIntyre said.

DEC flak grounds Air Force contract

MAYNARD, Mass. — The U.S. Air Force last week said it will suspend bidding on a $3.5 billion computer contract protested by Digital Equipment Corp.

According to Frank Donovan, DEC government systems group spokesman, his firm contends that the contract unfairly restricts competition because the Air Force contract requirements for 20,000 computer systems "requires operating systems that conform to AT&T's proprietary System V Interface Definition as measured by AT&T's proprietary System V Verification Suite."

Joining DEC's protest last week was Wang Laboratories, Inc., Donovan said.

The formal complaint was filed by DEC Aug. 12; hearings were held last week on DEC's request to suspend the procurement until after the formal complaint has been heard, which will likely take up to 45 working days.

"We have no reason to believe the judge will not rule in our favor because the Air Force acquiesced" and suspended the bidding, Donovan said.

He added that while DEC is pleased with the suspension of the procurement because it gives the company more time to prove its case, "It's not by any means conclusive of anything. The protest has yet to be heard." A hearing is slated for Sept. 16 in Washington.

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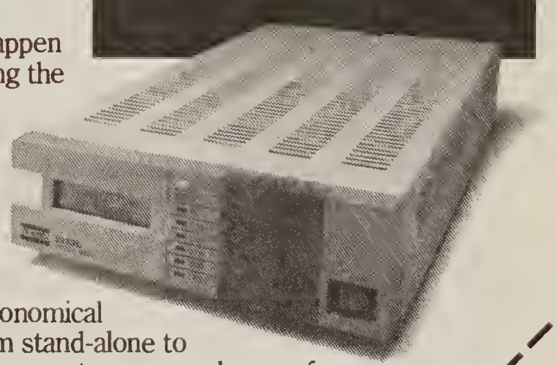

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EDITORIAL

See the light

A couple of years ago, a consultant rather irreverently said we'll see the paperless office of the future at about the same time we see the paperless bathroom.

Clearly, that individual did not foresee the real future of data storage, and that future belongs to optical disks.

As our Executive Report, beginning on page 55, demonstrates, optical storage, recently just a gleam in the eyes of visionaries, is inching closer to reality, driven inexorably by two forces. One is the explosive growth in storage needs. The other is the tremendous market potential in optical storage for the vendor community.

Optical storage represents a quantum technological leap compared with conventional magnetic storage. As the report notes, existing compact disk/read-only memory technology allows the distribution of the equivalent of 175,000 pages of ASCII text, plus indices, to a user with a microcomputer and a $700 drive. Along with recent developments in superconductors, optical storage is one of the few authentic gee-whiz technologies today.

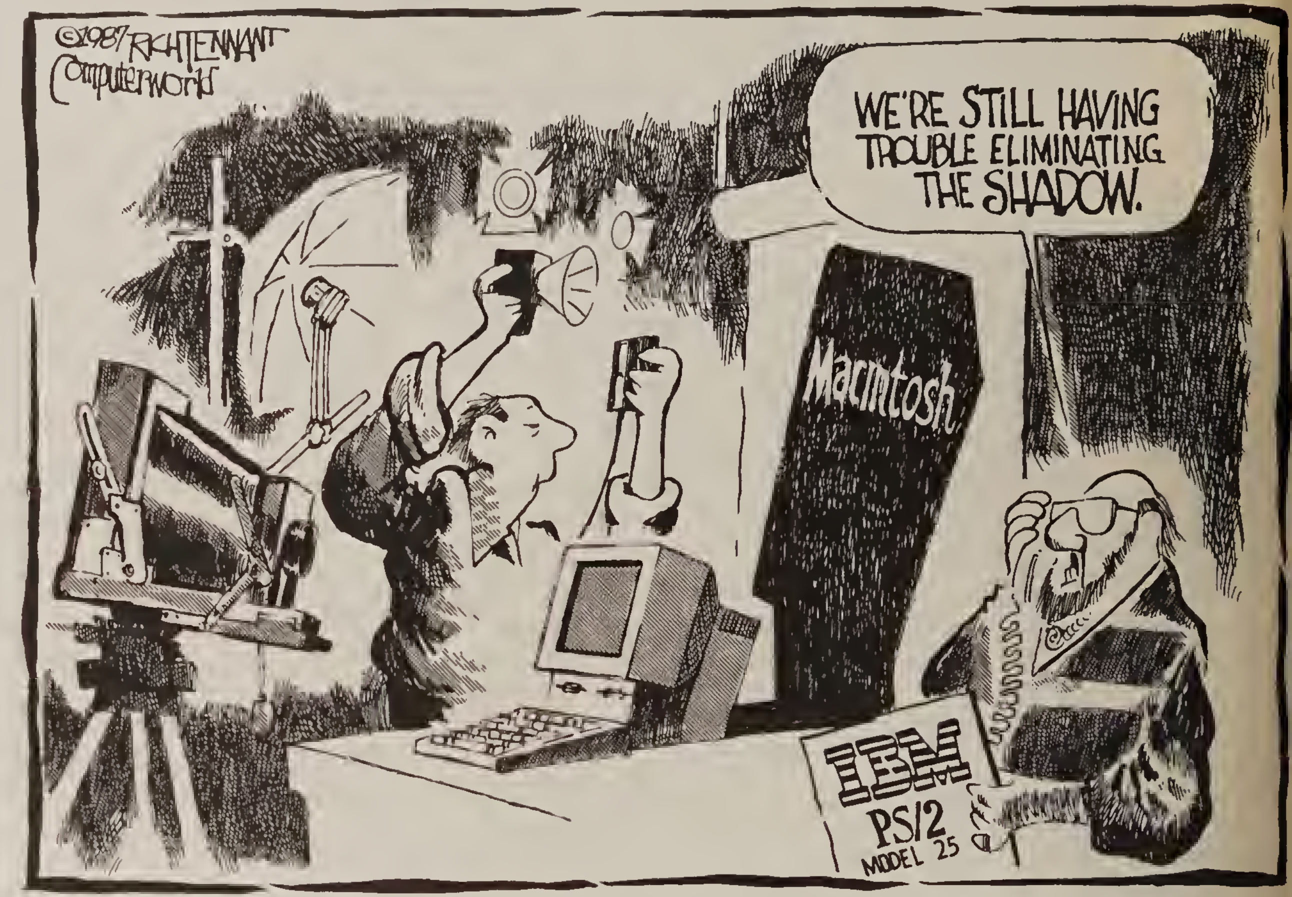
Personal computer managers are not the only ones excited about this technology. Conventional MIS pros are licking their chops over the potential resident in erasable optical disks, which are still in developmental stages. In compute-intensive industries, the amount of valuable office space occupied by large-scale direct-access storage devices can be literally measured in acres. A single erasable optical drive will replace dozens of today's large-scale DASDs. Skeptics say that erasable optical media is nearly a decade away. But these skeptics overlook the mighty efforts being made both abroad, by Matsushita Electric Industrial Co. in Japan and Philips N.V. in the Netherlands, and in the U.S., by Eastman Kodak Co., IBM and others, that will bring such products to market within five years — perhaps sooner — at affordable prices.

As optical disk technology blossoms, several critical issues will need to be addressed. What will be, and what *should* be, the role of MIS in implementing optical systems?

As one pioneering optical user notes in the report, this is a sizable political problem. The technology is so new that people don't readily have a handle on whether it is a data processing, department or end-user system and whether it can manipulate or just store data. Users are reluctant to let procurement get bogged down in the MIS acquisition process.

There are also critical standards issues with which the vendor community is wrestling. Any unnecessary delays in setting standards will certainly delay acceptance of the technology, because users have been burned by nonstandard technologies more than once in the past.

Pending the resolution of industry standards issues, optical technology will dominate storage in the next decade. As optical consultant Ed Rothchild says in the report, all the pieces are in place to turn optical technology into an essential tool.



LETTERS TO THE EDITOR

Not in our lifetime

I enjoyed Charles P. Lecht's column on the Japanese data entry predicament [CW, June 22], but I strongly disagree with his initial premise and conclusions.

He said that voice input will be successful first in Japan, passing lightly over the problems of dialect and inflection. He did not tell us that each *Kanji* ideogram has three or four pronunciations and may be written or printed in five styles. And he did not remind us of the importance of formality in the Japanese social structure.

Throughout the article, Lecht implied that voice input in Japanese is on the verge of success. He then closed by inferring that voice input for English must therefore soon follow.

But the problem is entirely different. In Japan, the challenge is to get an ideogram into the computer by any means, from weird 3,000-key keyboards to expert systems screening *Kanji* options from phonetic-symbol manual entry.

In the West, we already have great keyboarding. We can produce a handsome business letter. We can enter computer data fairly cheaply. Verification and error correction are straightforward. The problem is to do better with voice input.

Even if the Japanese succeed in eliminating keyboarding, which I do not believe will happen in any CW reader's lifetime, and even if here in the West we use voice recognition techniques to help paraplegics and to benefit senior executives, it emphatically does not follow that typing and key data entry will be superseded.

Herb Grosch
Mies, Switzerland

Still preliminary

I read "FBI info system expansion assailed" [CW, July 6] and believe that incorrect conclusions will be drawn by the otherwise uninformed reader.

The major premise of the article was that the National Crime Information Center (NCIC) Advisory Policy Board has made recommendations on a plan to expand its criminal information system, and the Federal Bureau of Investigation was mulling it over.

That is not the case. The board, composed of criminal justice administrators, is an advisory to the FBI on NCIC management. The purpose of their recent meeting was to review concepts developed by extensive interviews of the criminal justice community on what interstate information requirements, if provided by NCIC, would substantially enhance the effectiveness of the criminal justice community.

The significance of the recommendations is that sufficient need has been demonstrated by the NCIC user community for certain proposals, and they should be studied further.

No final board recommendations will be made until extensive review is made of societal impacts, civil liberty concerns, architectural design considerations, fiscal considerations and other related issues. No planned growth for the NCIC 2000 system exists nor is the FBI considering such a plan at this time.

It is important to point out that the NCIC 2000 study was funded by Congress after oversight hearings addressed the scope of the study. The FBI has and continues to manage NCIC responsibly with primary sensitivity to civil liberty interests.

All current NCIC files have extensive security and privacy protection, including restrictive criteria on when information can be entered and limitations on agencies and individuals authorized to access the information.

Milt Ahlerich
Acting Assistant Director
Office of Congressional and Public Affairs
U.S. Department of Justice
Washington, D.C.

This week in history

Aug. 22, 1977
A U.S. Department of Commerce report urges President Jimmy Carter to create a national information policy because 46% of the U.S. gross national product is derived from producing, processing and distributing information, and half the labor force is engaged in information "activity."

Aug. 23, 1982
The Internal Revenue Service begins using its computer system to help enforce military draft registration despite feelings from congressmen, privacy advocates and the agency itself that the plan may be illegal.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

It's the man, not the machine

High-tech software development falls flat using low-tech management

RUSSELL LIPTON

You've heard, of course, about the revolutionary new technologies and methodologies that will transform tomorrow's software development shops — computer-aided software engineering (CASE), intelligent workstations, fourth- and fifth-generation languages and, ultimately, automated programming.

But these technologies, even if implemented, will at best only marginally affect the productivity of software development. If you disagree, consider the sorry history of every so-called software breakthrough in the past two decades.

BILL RUSSELL

Actually, the key factors driving substantive productivity improvements have been available for a decade. These factors have little to do with advanced technology and everything to do with the integrated technical management process required to produce the highly integrated product we call software.

Software begins with someone's request for the computer to do a useful task and ends with the user employing the result. In between, someone must decide what the software is to do, how it is to be designed, implemented and tested and, ultimately, maintained and enhanced over the required number of years. These activities interweave, loop back and forth and combine in a very difficult-to-predict fashion. Even the employment of the software life-cycle methodology — a true step forward — quickly runs up against the subtler tangled web of any software project.

In the real world, most development shops proceed in an ad hoc fashion. Design, if it takes place, bears little measurable relation to the initial requirements on the one hand and the ensuing code on the other. Testing is largely random, and a product's release is not infrequently driven by its announcement date rather than its quality.

No one really knows how much effort is expended by various product teams across the differing development phases. The financial people don't have a clue as to whether the delivered product represents a profitable use of the company's development resources.

The technology solutions cited rarely address the systematic, interwoven nature of the software development process. This fact should not be a surprise. It is still not clear whether we understand the development process well enough to develop software tools and environments with the requisite power and flexibility to drive and coordinate the multitude of separate development events. But even this observation hides the key problem, which is that we cannot look to our software to drive and coordinate something that is fundamentally a management, not a technology or machine, issue.

For example, during the past 10 years, a wide number of sophisticated data base management systems and fourth-generation language products have appeared, most making the claim that software development will be revolutionized and productivity increased by up to a 10-1 ratio. But which aspect of development and which piece of the productivity equation is being addressed? Typically, it is the coding phase that reaps improvements. The many other phases of software development (with the possible connected exception of maintenance) are left untouched. Total productivity gains for the entire project may only be 20% to 30% rather than the claimed 1,000%.

The fact that most of these products are aimed at the programmer makes my point. Software development is not viewed as a highly integrated and interdependent series of activities. To be sure, CASE products, in their still primitive efforts to bring control to the design phase of development, illustrate a more sophisticated realization of the larger problem. Obviously, if we have a choice between using a productivity-enhancing tool, however limited, and no tool, we will choose to use a tool. But we would be better advised to use productivity-enhancing people.

Balancing act

The challenge is, on the one hand, to bring the many varied human disciplines of software development into play and, on the other, to measure the players and make them accountable to one another, to the corporation and, remarkably enough, to the customer.

It means, for example, bringing people from such disciplines as education, finance, technical communications, human resources and technology processes into intimate relationships with architects, coders, testers and maintenance programmers. When software development personnel are educated, they are able to move flexibly between project teams with maximum retention of skill. When the costs of project management are tracked and quantifiably related to final product and revenue, intelligent decisions can be made for the first time about the utilization of resources.

A good story from my own experience runs as follows: A super programmer once said to me of a very capable senior software manager, "What does that guy know about software? He hasn't programmed in 30 years. All he's done is manage." We all know that management has nothing to do with software, right?

Technology is always a temptation wherever we try to substitute it for the need for human management. Software development — and the use of software by customers — is all about man and machine, not machine without man.

The real litmus test of tomorrow's software productivity revolution will be this: When you pick up *Computerworld* on Jan. 1, 2000 and read a reprint of this article, will you know it is a reprint? Or will the simple management processes we describe here still sound fresh, radical and modern? Ironically, we have been able to develop tomorrow's software using yesterday's techniques for quite some time now.

Lipton consults on software productivity in the U.S. and France with New York-based James Frame Enterprises, Inc. He is currently writing books on expert systems and SQL-based products.

Thirsty for the truth in the factual desert

READER'S PLATFORM

ROBERT KENDALL

Picture two businessmen on the golf course. One says, "You should get yourself a computer so you have the facts instead of using guesswork and intuition." The other responds, "We've certainly thought about it, but does it pan out economically?" The first businessman answers, "We don't know for sure, but our information systems manager has a hunch that it will."

One could argue that businessmen today who are not fully up on computers probably wouldn't take time off for golf. Neither is the inherent value of computing so much in question.

Yet, for a function that supplies so much data to others, it is surprising how little data processing generates for its own use.

Nowhere is the lack of data so evident as in making trade-offs between program development and computer operations. A recent Viewpoint article by Efrem G. Mallach [CW, May 4] centered on the observation that "the computing capacity of the U.S. would be doubled overnight if people knew how to program." While the author went on to weigh whether machine efficiency was the appropriate goal, there was no challenge to the statement itself.

Doubling possibility?

The statement is subject to question, however. Could we cut the average program runtime in half by better techniques — not just a few notorious examples, but enough to truly double the computing capacity of the U.S.?

And if all application programs were twice as efficient, how much difference would it make? We can ignore the obviously impossible task of improving all existing programs overnight — increasing emphasis on maintenance attests to the immensity of that task.

Ignoring that, however, puts us no closer to answering the question unless we assume that computers run only application programs.

Of course, that is not true. In large mainframes, more than half the CPU cycles are consumed by the operating system. (In some cases, the figure is more than 70%.)

In studying one large interactive and networked order-entry system to see how its capacity might be stretched, the discovery was made that only 2% of the cycles were used by application code. The rest were used by system code and the control program, leading one to observe that if all application functions were removed and the time reduced to zero, there would be no detectable improvement in throughput.

In studies conducted years ago, it was discovered that in more than half the cases, the CPU cycles taken to schedule a task exceeded that task's running time.

A large portion of the remaining capacity goes to running sort programs and utilities that support DP applications. Direct-access storage device dumps and file reorganizations take huge bites out of computer capacity, as do other utilities, catalog updates and system maintenance runs.

How much time is taken in such system service functions? An educated guess suggests at least half. That leaves us with a surprising 25% of the system available for running application code.

Well, not quite. We shouldn't forget compiling, testing and other application development services. Indeed, as computer-aided software engineering tools take hold, this use of computers is one of the most rapidly expanding.

Even before that, though, a substantial number of programs spent more of their lifetimes in the computer as source code being compiled than as object code being run.

Now we are down to 25% or less of the computer cycles being devoted to application code — clearly not enough to contribute to the goal of doubling the capacity of computing in the U.S.

Just the facts

The fact is there are no facts — no data about this vital DP activity. Until such facts exist, we will be confronted with a pseudoscience of supposition based on the intuitively obvious and frequently erroneous.

We cannot understand computer usage and its relationship to programming productivity until we substitute investigation and learning for those baseless things that "everybody knows."

Until then, vendors won't truly know what to build, customers won't know what to demand of them and users won't know why or how to make the right trade-offs.

Kendall is a research fellow for Software Productivity Research, Inc. in Cambridge, Mass., and a consultant in programming productivity and measurement.

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SOFTWARE & SERVICES

SOFT TALK

Rosemary Hamilton

Reinvent info center

Many information centers are in the midst of an identity crisis, and one of the first things they should do is find a new name.

The term information center is dying out. Even executives within IBM, the founding father of information centers, acknowledge that the moniker is an antiquated term.

In an effort to redefine themselves within a corporation, information centers should more clearly identify themselves for what they are.

Within today's information centers, the responsibilities vary greatly. Some centers are devoted to microcomputing; others support both mainframe computing and personal workstations. Some are involved with departmental computing issues. Some tackle expert system technology.

Yet they all have one thing in common: end-user support. A new name defining them as the end-user support organization would bring them more meaningful recognition within their company.

Continued on page 22

M&D moves tool package to DEC

Will move Millennium to VAX by mid-'88, CEO Dodge vows at meeting

BY CHARLES BABCOCK
CW STAFF

CHICAGO — McCormack & Dodge Corp. will move its popular Millennium application environment to the Digital Equipment Corp. VAX by the middle of next year, said Frank H. Dodge, chairman of the Natick, Mass.-based software house, at M&D's 10th annual user conference here last week.

A prototype DEC version is being developed by M&D's Bristol, England, research group, which two years ago produced the version of Millennium that runs on hardware from British manufacturer ICL PLC. The prototype is expected to be ready by the end of the year, Dodge said in an interview.

Frank H. Dodge

The initial Millennium environment provided the data sharing capability of the original Millennium accounting series and grew into an application development environment with its own tool set. What is known as Millennium: SDT, a customization and development system using the Millennium platform, can be expected to compete in the future with DEC's extensive tool set for the VMS operating system, Dodge said. He added, however, that M&D is undertaking the move with DEC's assistance.

Moving Millennium into the DEC world will enable M&D to move applications to the VAX much more quickly, Dodge said. DEC is helping M&D make the move because DEC believes the software firm's accounting and human resource applications will help VAXs move into mainstream data processing, he said.

M&D, which has sold software for the VAX for eight years, currently offers much of its accounting and manufacturing lines for use under DEC's VMS. Mainframe software still accounts for 78% of M&D's revenue, but Dodge said he anticipates VAX software will represent 30% to 35% of revenue by 1992. Non-mainframe revenue — currently 22% of the $122 million M&D garnered in 1986 — is derived from sales to customers of Hewlett-Packard Co. machines, IBM System/38s and Honeywell, Inc. computers as well as VAXs.

Dodge attributed the growth to steady demand for M&D's product line and said his firm's revenue is expected to be close to $150 million in 1987.

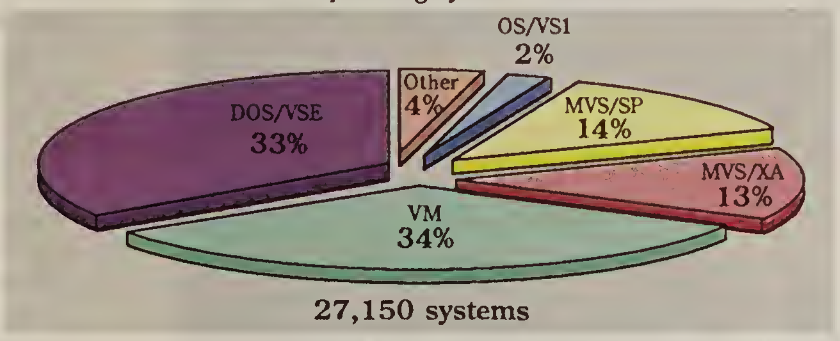
The revenue figures were cited, some M&D observers suggested, to scotch rumors that M&D's owner, Dun & Bradstreet Corp., wants to sell M&D after unloading D&B Computing Services, another subsidiary and maker of the Nomad II fourth-generation language.

In the opening address to the 2,000 assembled users, Dun & Bradstreet Chairman Charles Moritz said, "While it would seem that some — including, perhaps, our competitors — might like to see us sell M&D, I'm afraid I must disappoint them."

Data View

VM and DOS/VSE operating systems still dominate IBM mainframe sites

Although MVS/XA represents nearly half of all MVS sites, VM and DOS/VSE make up two-thirds of the installed base of mainframe operating systems



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

IBM's latest Unix offering has built-in 9370 support

RYE BROOK, N.Y. — IBM has rolled 9370 support into its latest Unix offering, the company announced recently.

"This is to satisfy the demand they know they'll get from some quarters," said Kate Comiskey, an analyst at International Data Corp. in Framingham, Mass. "There is potential for Unix on the 9370, but I don't think they'll aggressively push it."

In addition to 9370 support, the Interactive Executive for the 370 (IX/370) Version 1.1.4 will

Continued on page 24

Inside

- Carnegie Group to sell Knowledge Craft components individually. Page 22.
- DEC rolls out upgrade packages for PDP-11, MicroPDP-11. Page 28.

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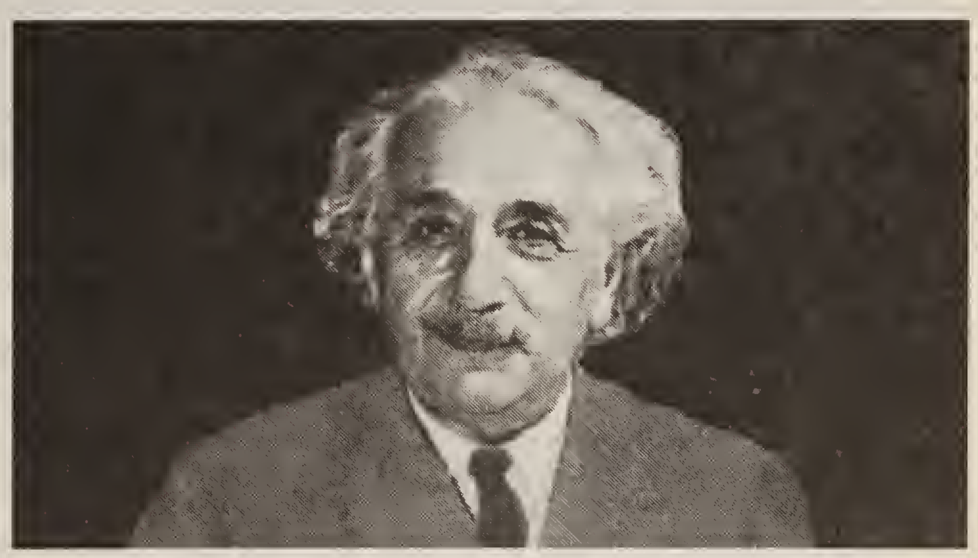

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Tool manages licensed PC packages

NORTH PALM BEACH, Fla. — Applied Software, Inc. recently introduced a mainframe-based system designed to manage the use of microcomputer software.

Designed to run under the IBM MVS and VM operating systems, Host Storage & Retrieval (HSR) acts as a clearinghouse for personal computer software, according to Walter Josephson, president of Applied Software.

HSR is intended to work with software programs under site-license agreements, he added. It includes a microcomputer component called the Dialog Facility that lets users request copies of microcomputer programs from the HSR mainframe component. The component automatically distributes software to workstations based on the software's availability and the user's security clearance.

HSR includes a backup facility for the PC software, and microcomputer users can identify which files are included in the backup. The system generates reports for given time periods so that an administrator can track and analyze microcomputer software usage.

HSR carries an $8,000 license fee for either MVS or VM operating environments. Each microcomputer HSR component costs $90.

System tracks VM problems

SACRAMENTO, Calif. — RD Labs, Inc. recently said it plans to release next month a problem-and-change management system for the IBM VM operating system.

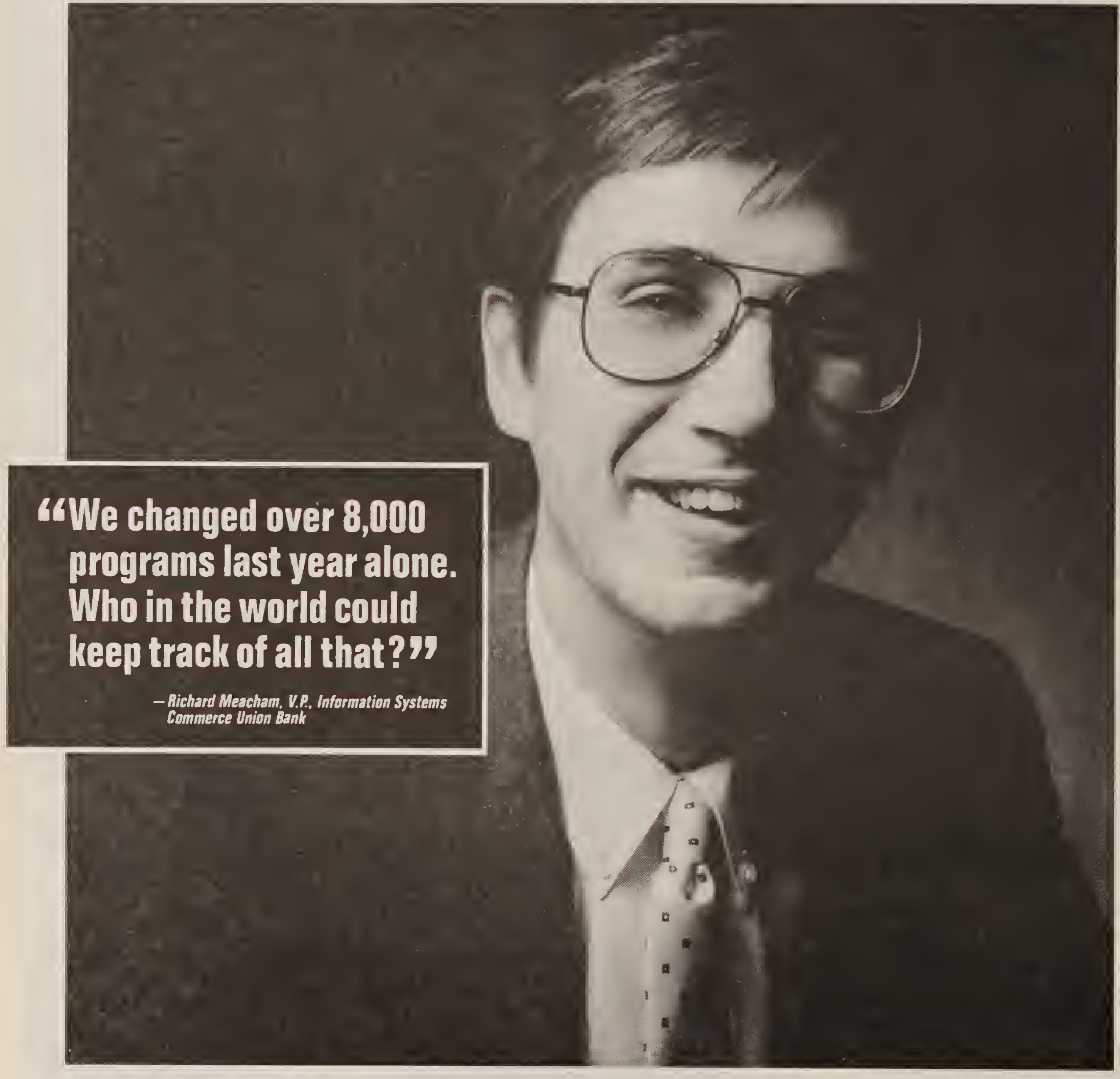
RD/Change was designed to help users keep track of problems and make changes in a more controlled manner. It does so by providing a problem-and-change life cycle methodology that users can follow from the onset of a problem until it has been fixed.

The system is based on a generic life cycle that the company has built into RD/Change. For instance, when a problem is entered into the system, it is given a "new" status. It then becomes an "assigned" problem once it has been given to a staff member who analyzes the problem.

If a request for a programming change is made, it is given an "open" status, which it maintains until the work on it has been completed. It then moves to a "review" status during which the changes will be examined and either approved or rejected. It finally moved to a "closed" status.

Users may customize the system to include additional steps in the life cycle, the company said. RD/Change can generate status reports of ongoing problems.

RD/Change runs under VM/SP Release 4.0 or higher. The company uses a graduated pricing structure, and the software license ranges from $3,675 for low-end systems to $11,675 for high-end processors.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"We changed over 8,000 programs last year alone. Who in the world could keep track of all that?"
—Richard Meacham, V.P., Information Systems
Commerce Union Bank

It must have been a programmer who said the only thing that remains constant is change. No sooner is a program completed than changes get made. And so many get made so often that staying in control of it all can be more than humanly possible.

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Info center

CONTINUED FROM PAGE 21

Today, the phrase "information center" doesn't mean much. Actually, it never really did, so perhaps they should have been called end-user support centers in the first place.

Strip away whatever knowledge you might have of what its function is and isolate the words "information center." What is that? A center of information. Whose information? What in those words associates this department with end users? Such a vague title could belong to the accounting or legal department. After all, they are centers of information, too.

IBM set the style

Despite its ambiguity, the term information center really took off because of IBM's backing. In the early 1980s, IBM was heralding information centers as the new way to manage end users. It had a "fly-in" program in which it would fly executives from customer sites to see its own information centers.

Such centers sprouted like weeds as users took their cue from IBM. At that time, information centers were primarily set up around a mainframe system to accommodate end-user requests and lessen the burden on MIS.

That information center, however, is long gone, and IBM plays a much more low-key role in the information centers of today. "I think the way IBM is looking at things is that the office is all-encompassing," IBM's Edward Baas said recently.

Baas, a senior marketing support representative for office software marketing, said, "It's not just information centers or specialty tools that we're looking at but a broad range of areas for productivity gains."

With IBM no longer playing the central role in information center activity, now is the time for users to come up with their own identity.

"End-user computing center" is not quite as catchy a phrase as information center. But at least it says something that will more clearly distinguish this group to a company's computing community.

Hamilton is a *Computerworld* senior writer.

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Implementing relational technology can present compatibility and performance problems. Not with PowerHouse — it's tightly integrated with Digital's and DG's databases and operating systems to guarantee you exceptional 4GL/DBMS performance. You enjoy the combination of a fast-execution language and databases optimized by your computer manufacturer. And wherever they take their hardware and software — your applications and data will go too.

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PowerHouse gives you total development capability in one language, and not a collection of weak DBMS utilities and interfaces. Regardless of which database you're using, PowerHouse gives you advanced, dictionary-driven development power to prototype and build 'production' commercial applications.

And Cognos has a full-service organization to back you up. For more information, call toll-free, **1-800-4-COGNOS**. In Canada, call 1-613-738-1440. In the U.K., call +44 344 486668. Or call on any of our 40 Cognos offices around the world and find out why 7,000 customer sites use PowerHouse.

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Unix

CONTINUED FROM PAGE 21

include full-screen editing for IBM 3270 display stations and on-line documentation, IBM said.

Version 1.1.4 should be available by the end of September, the company added.

Early 9370 users were able to run IX/370 Version 1.1.3, which was introduced in January, if they requested a service update. In such cases, IBM service representatives would have to modify the IX/370 code on-site.

Version 1.1.4 will enable 9370 users to run this Unix operating system without modification, according to IBM.

'A program product'

"This is now considered a program product. It's much easier to install," an IBM spokeswoman said.

IX/370 can operate only as a guest under the VM operating system on IBM's 9370. It will require VM/SP Release 3.0 or higher, the company said.

Depending on the type of processor, the one-time charge for Version 1.1.4 will reportedly range from $10,000 to $75,000.

SOFTWARE NOTES

Rise wins printing patents; Focus link forged

Rise Technology, Inc. in Cambridge, Mass., has been assigned two 17-year **U.S. patents** that protect its technology to print photographs on a printed page using a computer-aided publishing system. Rise brought a publishing system to market in 1986 that included a Masscomp computer, an enhanced Canon U.S.A., Inc. scanner and a video camera.

Information Builders, Inc. has interfaced its **Focus** fourth-generation language and data base management system to the Britton Lee, Inc. relational data base computer.

The **Knowledge Engineering Environment** (KEE) has been demonstrated on an **Intel Corp.** 80386-based microcomputer, according to officials of Mountain View, Calif.-based producer **Intellicorp Inc.** KEE, used in developing expert systems, was previously limited to workstations from Sun Microsystems, Inc., Symbolics, Inc., Texas Instruments, Inc. and Digital Equipment Corp. Intellicorp also recently received a U.S. patent covering KEE's frame-based representation facility for applying general knowledge to specific applications.

DEC has signed a distribution agreement with **Relational Technology, Inc.** that allows DEC to sell the **Ingres** relational data base management system to its customers using **Ultrix**, DEC's version of Unix. Relational Technology will continue to sell Ingres to Ultrix and VMS users and will provide support for the product.

Spokesmen for **Relational Technology** said **Ingres** is now available on the operating systems provided by California-based supermini manufacturer **Elxsi.** The operating systems include Unix 4.2, AT&T's Unix System V and Embos.

Arthur D. Little, Inc. and systems integrator **ITP Boston, Inc.** in Cambridge, Mass., have agreed to team up to offer a one-stop source of consulting on manufacturing processes and systems.

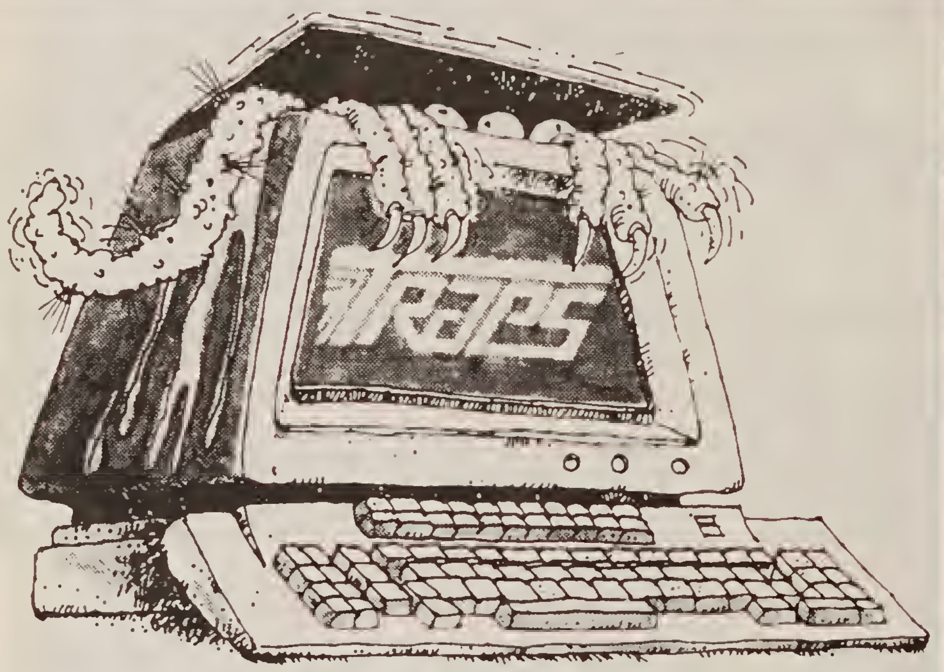
Oracle Corp. spokesmen said that firm's relational data base management system will be jointly marketed by **Convex Computer Corp.** for use on Convex's **C1 series** of minisupercomputers. In addition, the **Oracle DBMS** will be jointly marketed by Elxsi for use on the Elxsi System 6400 minisupercomputer.

Pansophic Systems, Inc. will sell **35mm Express**, personal computer-based presentation software from Business and Professional Software, Inc. in Cambridge, Mass., for use with Pansophic's **Starburst**, a turnkey IBM Personal Computer AT-based presentation-graphics system.

The **Software Maintenance Association** named **Imperial Oil Ltd.** in Toronto as the recipient of its **Distinguished Performance in Software Maintenance award.** The association cited Imperial's "systematic methodology for managing systems" and its "active synergism of users and data-processing professionals."

Fujitsu Ltd. in Tokyo will market **Cullinet Software, Inc.**'s **IDMS/R** on Fujitsu's **Facom** M series of computers under a three-year agreement between the two companies.

Telesoft said it has signed a three-year contract with **Cray Research, Inc.** to port its Ada compiler and productivity tools to the Cray-2 and Cray X-MP supercomputers, which run under Unicos, Cray's version of Unix. Cray will have a license to market the Ada software, Telesoft said. In addition to the Ada compiler, Telesoft will be porting its source-level debugger, global optimizer and other language tools to the Cray environment.



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Marriott Newton Hotel
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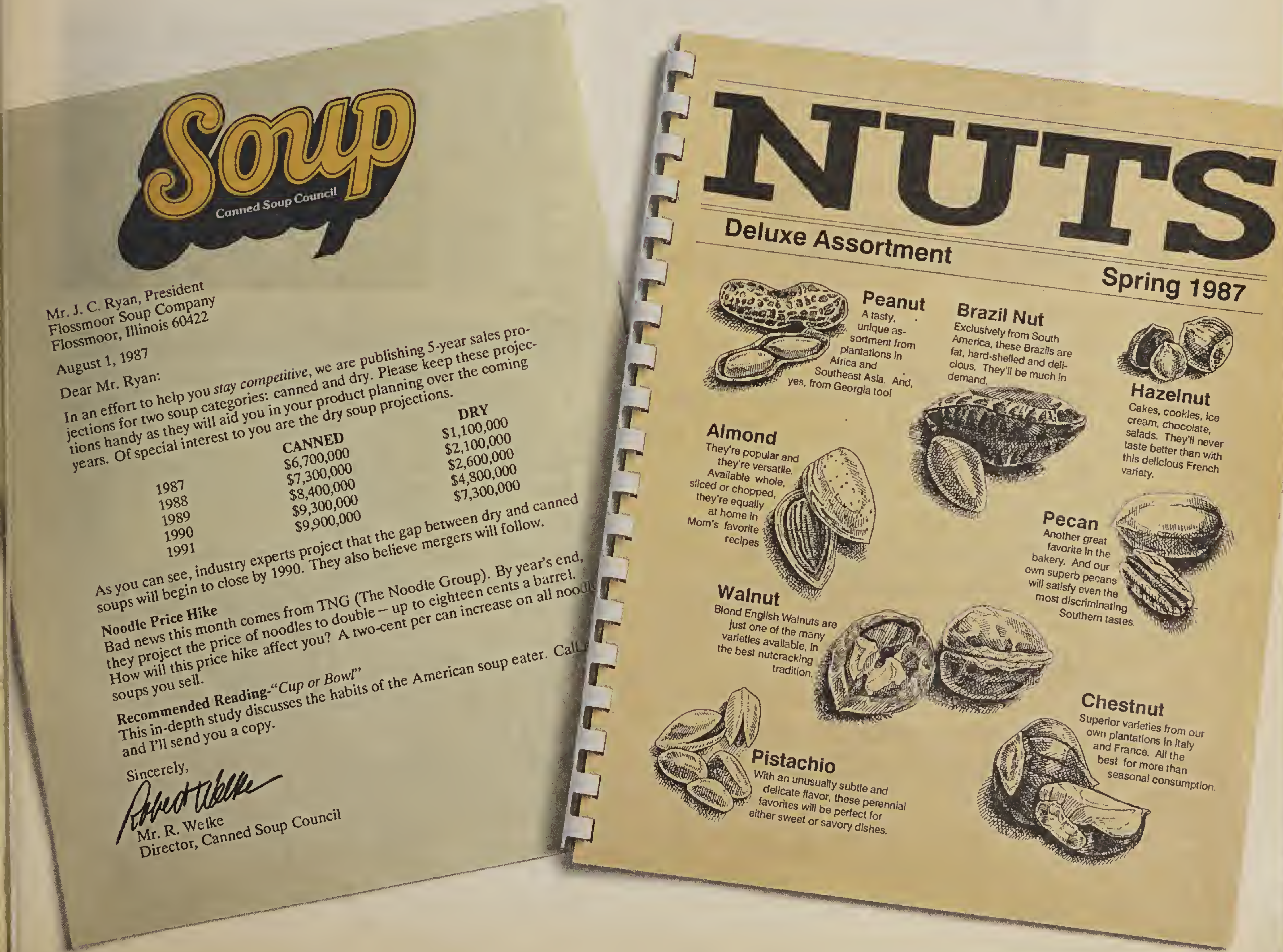

Soup
Canned Soup Council

Mr. J. C. Ryan, President
Flossmoor Soup Company
Flossmoor, Illinois 60422

August 1, 1987

Dear Mr. Ryan:

In an effort to help you *stay competitive*, we are publishing 5-year sales projections for two soup categories: canned and dry. Please keep these projections handy as they will aid you in your product planning over the coming years. Of special interest to you are the dry soup projections.

	CANNED	DRY
1987	$6,700,000	$1,100,000
1988	$7,300,000	$2,100,000
1989	$8,400,000	$2,600,000
1990	$9,300,000	$4,800,000
1991	$9,900,000	$7,300,000

As you can see, industry experts project that the gap between dry and canned soups will begin to close by 1990. They also believe mergers will follow.

Noodle Price Hike
Bad news this month comes from TNG (The Noodle Group). By year's end, they project the price of noodles to double – up to eighteen cents a barrel. How will this price hike affect you? A two-cent per can increase on all noo
soups you sell.

Recommended Reading-"*Cup or Bowl*"
This in-depth study discusses the habits of the American soup eater. Cal
and I'll send you a copy.

Sincerely,

Robert Welke

Mr. R. Welke
Director, Canned Soup Council

NUTS

Deluxe Assortment

Spring 1987

Peanut
A tasty, unique assortment from plantations in Africa and Southeast Asia. And, yes, from Georgia too!

Brazil Nut
Exclusively from South America, these Brazils are fat, hard-shelled and delicious. They'll be much in demand.

Hazelnut
Cakes, cookies, ice cream, chocolate, salads. They'll never taste better than with this delicious French variety.

Almond
They're popular and they're versatile. Available whole, sliced or chopped, they're equally at home in Mom's favorite recipes.

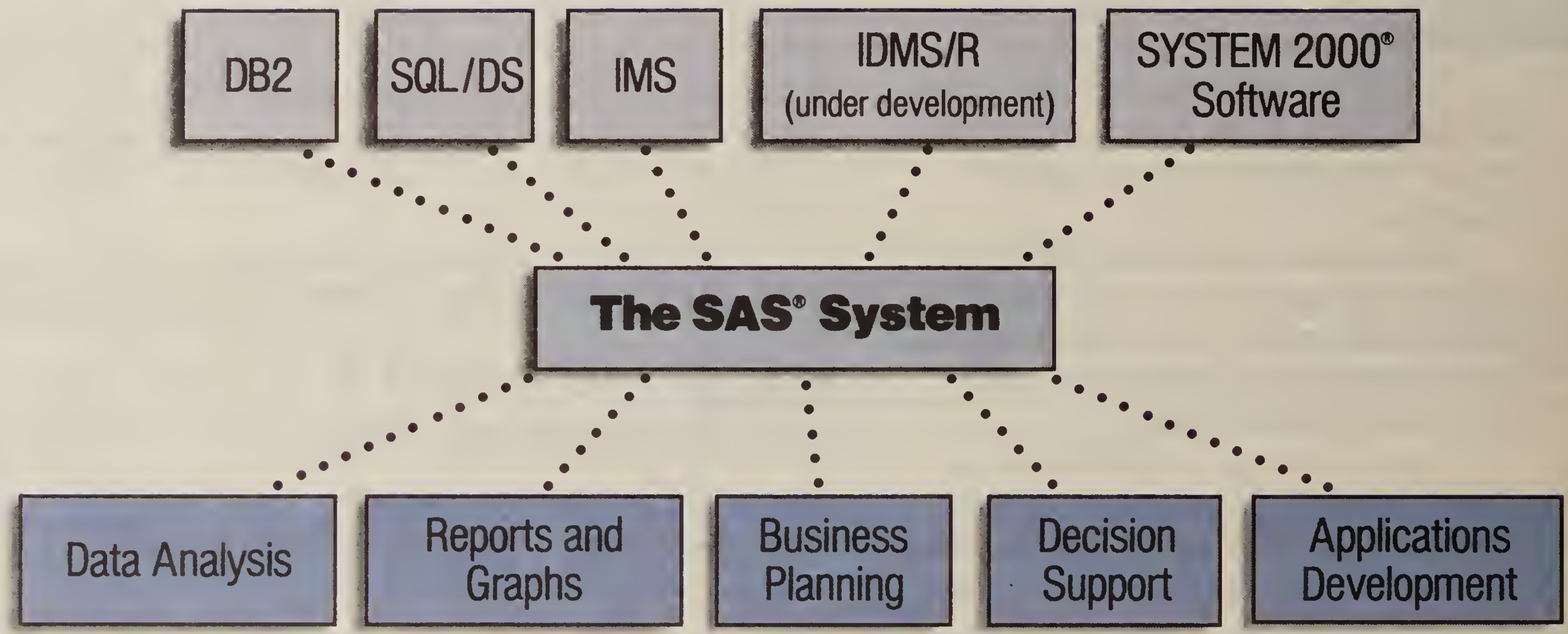
Pecan
Another great favorite in the bakery. And our own superb pecans will satisfy even the most discriminating Southern tastes.

Walnut
Blond English Walnuts are just one of the many varieties available, in the best nutcracking tradition.

Chestnut
Superior varieties from our own plantations in Italy and France. All the best for more than seasonal consumption.

Pistachio
With an unusually subtle and delicate flavor, these perennial favorites will be perfect for either sweet or savory dishes.

Get the Facts from Your DBMS.



The most powerful applications software has joined forces with the most popular data base management systems. To turn raw data into meaningful facts. To analyze, estimate, optimize, simulate. To produce custom reports and color graphs. Whatever your information need, the SAS System delivers more from the data you store.

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Or develop your own applications with the SAS System's efficient fourth-generation language. Customize these applications any way you wish.

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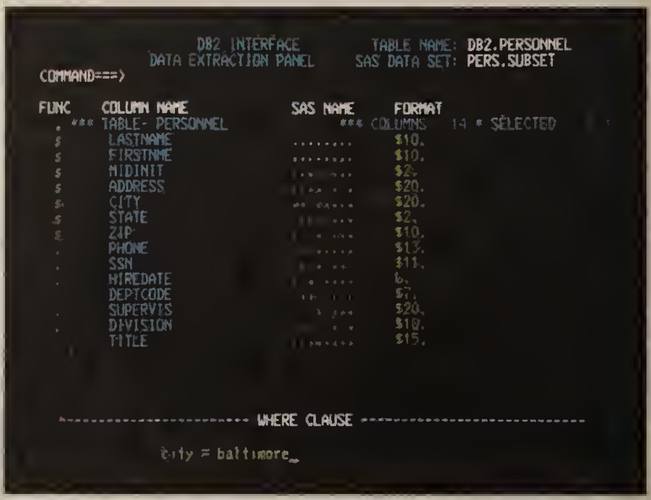

```
                    DB2 INTERFACE          TABLE NAME:  DB2.PERSONNEL
                DATA EXTRACTION PANEL     SAS DATA SET: PERS.SUBSET
COMMAND===>

FUNC    COLUMN NAME                SAS NAME      FORMAT
  . *** TABLE- PERSONNEL                  *** COLUMNS   14 * SELECTED
  s       LASTNAME                 ........      $10.
  s       FIRSTNME                 ........      $10.
  s       MIDINIT                  ........      $2.
  s       ADDRESS                  ........      $20.
  s       CITY                     ........      $20.
  s       STATE                    ........      $2.
  s       ZIP                      ........      $10.
  .       PHONE                    ........      $13.
  .       SSN                      ........      $11.
  .       HIREDATE                 ........      6.
          DEPTCODE                 ........      $7.
  .       SUPERVIS                 ........      $20.
  .       DIVISION                 ........      $10.
          TITLE                    ........      $15.


  ---------------------- WHERE CLAUSE ---------------------------

              city = baltimore_
```

Extract data from your DBMS for use in SAS System applications. Load data from the SAS System directly into your DBMS. Update values in a data base directly from a SAS System application. All without risk to data security. The SAS System lets you choose which users browse or update specific files.

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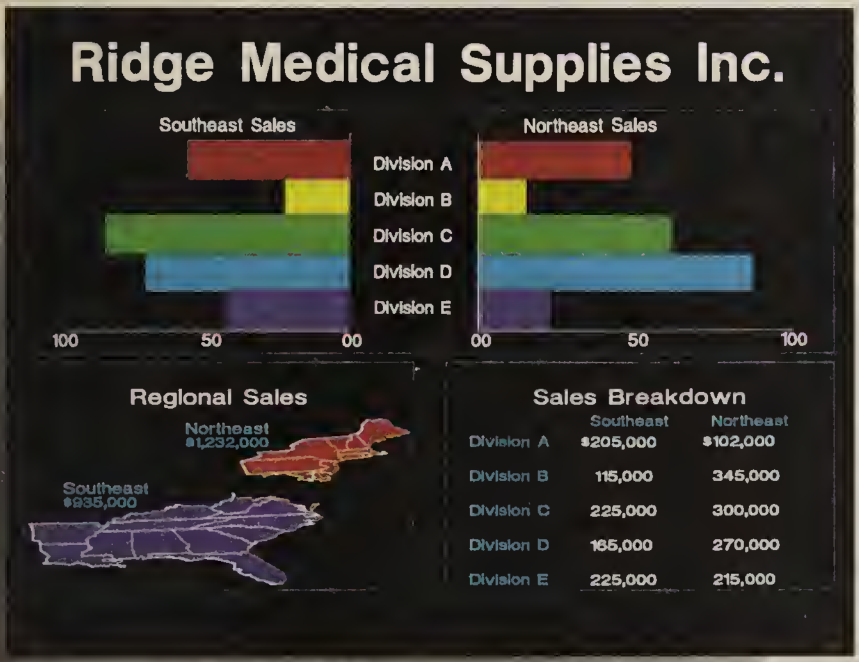
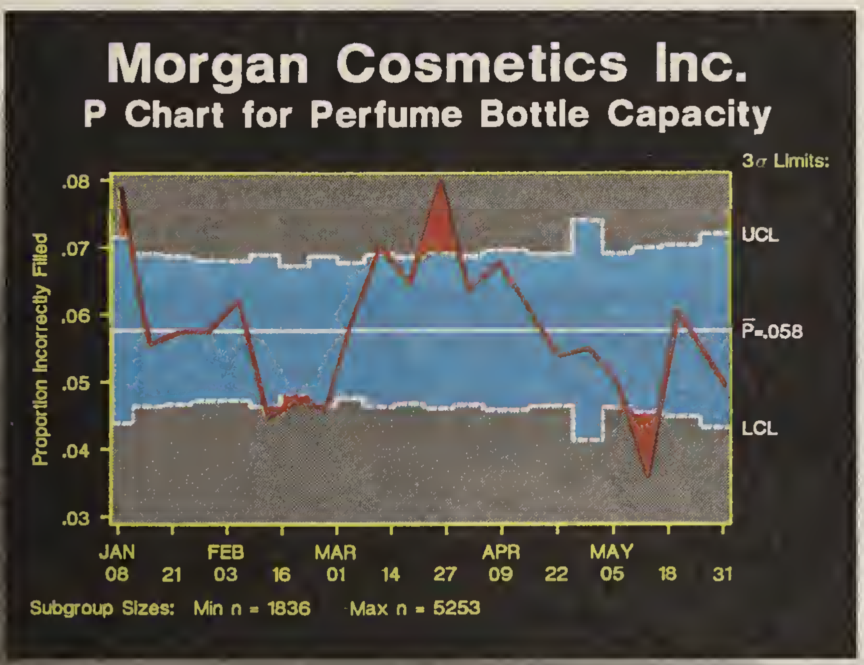
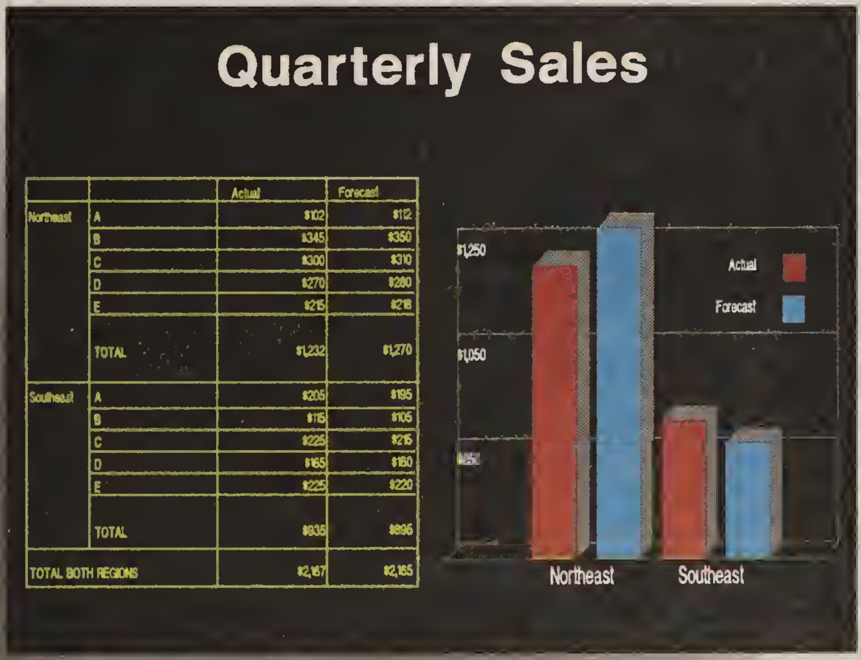
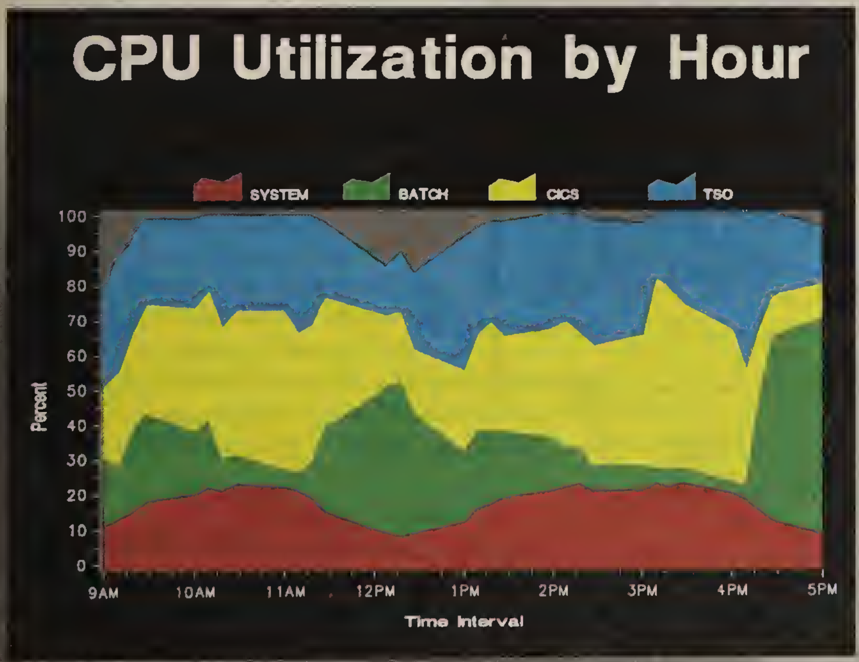


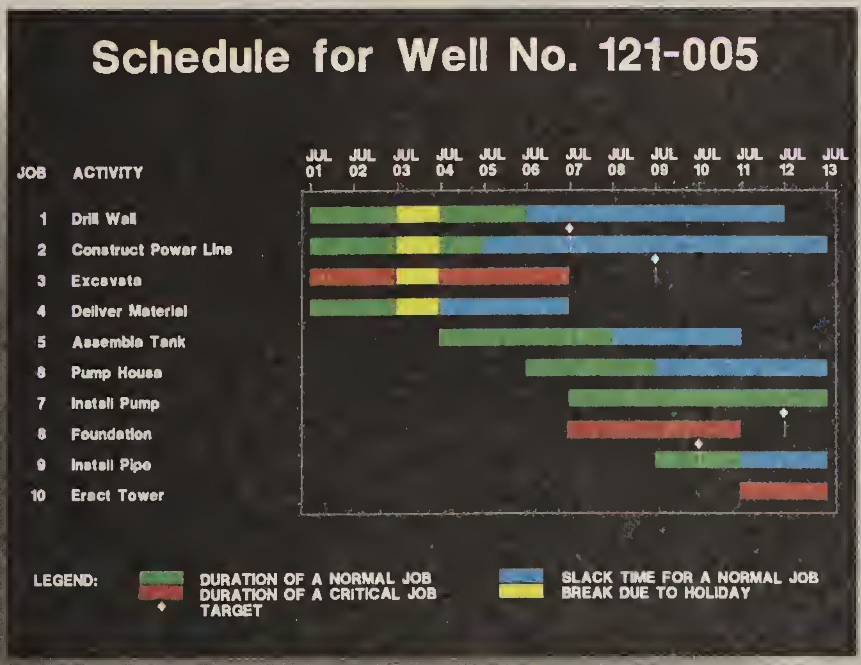
	Southeast	Northeast
Division A	$205,000	$102,000
Division B	115,000	345,000
Division C	225,000	300,000
Division D	165,000	270,000
Division E	225,000	215,000





		Actual	Forecast
Northeast	A	$102	$112
	B	$345	$350
	C	$300	$310
	D	$270	$280
	E	$215	$218
	TOTAL	$1,232	$1,270
Southeast	A	$205	$195
	B	$115	$105
	C	$225	$215
	D	$165	$160
	E	$225	$220
	TOTAL	$935	$895
TOTAL BOTH REGIONS		$2,167	$2,165





JOB	ACTIVITY
1	Drill Well
2	Construct Power Line
3	Excavate
4	Deliver Material
5	Assemble Tank
6	Pump House
7	Install Pump
8	Foundation
9	Install Pipe
10	Erect Tower

The SAS System runs on IBM Corp.'s 370/30xx/43xx and compatible machines, as well as minicomputers and personal computers.

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NEW PRODUCTS

Systems software

RGL Business Systems, Inc. has announced the **Logistics Module** component for its On-Line Material Management System, which runs on Digital Equipment Corp. VAX computers and IBM mainframes.

The software allows users to manage and control material through the purchasing, traffic and transportation, warehouse and job-site receiving and inventory-management processes. The software allows multiple currency handling.

The pricing for the Logistics Module starts at $70,000.

RGL Business Systems, P.O. Box 1006, Bloomfield, N.J. 07003.

Digital Equipment Corp. has introduced four **upgrade packages** for **PDP-11** and **MicroPDP-11** computers said to provide such features as complete software compatibility, improved packaging and peripheral selection and enhanced system performance.

The PDP-11 system upgrade kits include all hardware, operating system software, documentation, field-service hardware installation and a software license upgrade. Prices for the products range from $10,200 to $11,750.

A Microvax system upgrade package, said to allow users to move from the Microvax I system to the Microvax II while retaining their software and hardware enclosures, was also announced. It costs between $13,400 and $22,400.

DEC, 146 Main St., Maynard, Mass. 01754.

Computer Consoles, Inc. has introduced software said to allow Wang Laboratories, Inc. 2200 users an upward migration path from the 2200 systems to Computer Consoles' Unix-based Power 5 and Power 6 computer systems.

The **Basic-K** compiler allows Wang 2200 applications to be moved onto Computer Consoles processors, which can support more than 80 users.

The compiler under Unix reportedly offers such language extensions and operating system enhancements as Unix utilities for performing previously programmed functions, open file systems with nonrestrictive sizing, expanded memory capabilities and the ability to migrate to data bases.

Prices for the Basic-K compiler range from $1,500 to $4,500.

Computer Consoles, Suite 1700, 950 Winter St., Waltham, Mass. 02154.

Languages

A version of the Fortran programming language designed to ease the movement of applications running on Digital Equipment Corp. VAX/VMS workstations to Sun workstations has been announced by **Sun Microsystems, Inc.**

Sun Fortran 1.0 includes VMS extensions said to give Sun workstation users access to the application code written with VMS Fortran.

Other enhancements include improved error messages and recovery and the Pointer data type, which provides partial compatibility with Cray Research, Inc. Fortran.

Sun Fortran 1.0 costs $400 and reportedly will be available in September. It runs on the Sun-3 and Sun-2 families of workstations with Sun OS operating system Release 3.2 or later.

Sun Microsystems, 2550 Garcia Ave., Moutain View, Calif. 94043.

Utilities

WPmonitor, a utility for the capture and reporting of Wang Laboratories, Inc. VS IIS word processing statistics, has been announced by **BEI Corp.**

The core monitor program runs in the background and automatically captures, for each on-line document edit session as it occurs, the operator user identification, document number, library, volume, time, date, workstation number and revision number. It also calculates the exact individual edit-session statistics for time, number of keystrokes, number of lines and number of pages. A report generator allows creation of custom reports.

Software pricing is tiered and follows Wang's A, B and C CPU classifications. A single class-B license is $5,000.

BEI, 2921 Eastlake Ave. E., Seattle, Wash. 98102.

Hewlett-Packard Co. has announced a software tool called **HP Visor/V**, which allows users to generate reports and ad hoc inquiries from relational data bases on the vendor's HP 3000 computers.

HP Visor/V works with HPSQL/V, HP's relational data base that conforms to SQL. Names of data bases, tables and columns are supplied as menu options so users can produce custom reports, according to the vendor.

In addition, SQL commands can be entered to initiate queries, create new data base items, change rows of data and maintain the data base.

Other features include on-line Help, the ability to view and modify a report before printing and the ability to save queries, reports and sequences of commands for future use.

HP Visor/V costs $10,000 for the first copy and $7,000 for each additional copy.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

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MICROCOMPUTING

SMALL TALK

William Zachmann

Antsy over Hypercard

With a graphical interface like that of Apple Computer, Inc.'s Macintosh inexorably working its way onto IBM and compatible systems, I've been wondering lately how the Mac will retain its innovative edge. Working with Hypercard, a new extension to the Macintosh system software developed by Apple Fellow William Atkinson, goes a long way toward answering that question.

Hypercard is undoubtedly one of the most exciting, innovative software products I have ever seen. It will permit development of new types of applications that haven't appeared on personal computers before. It also offers a much easier way of doing many more traditional applications.

The greatest initial challenge with Hypercard is simply to characterize it. A highly innovative product, it just doesn't fit into the conventional categories of software for personal computers. Nevertheless, we humans have no other way to understand something new than to compare it with things we know and to

Continued on page 33

Sun mulls 386 PC

Could shine by beating foes to multitasking

BY ALAN ALPER
CW STAFF

NEW YORK — Sun Microsystems, Inc. is considering testing the high-end personal computer waters with a Unix-compatible, Intel Corp. 80386-based machine offering true multitasking capabilities.

A source inside Sun confirmed that a 386-based micro is under development but stressed that the Mountain View, Calif., firm has not yet committed to launching such a system. The source said a 386-based machine is among a number of options the firm is evaluating as its response to the convergence of high-end personal computers and low-end technical workstations.

"We're looking at four or five options," the source said. "Things such as software emulation or an add-in coprocessor board for our traditonal [Motorola, Inc.] 68000-based platform are also under discussion."

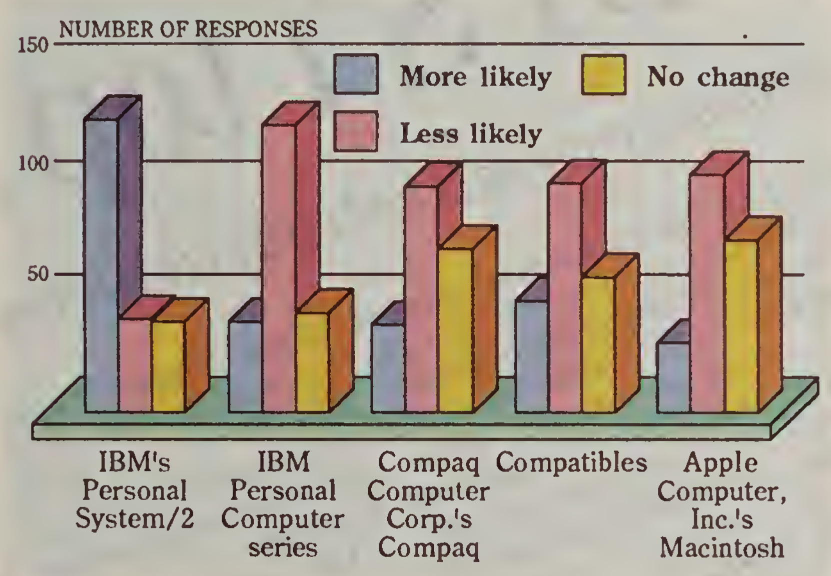
The advantage of a full-fledged 386-based machine is that it would allow Sun to better compete in the price-sensitive Microsoft Corp. MS-DOS-compatible portion of the microcomputer business, the source noted. Sun would unveil the 386-

Continued on page 32

Data View

PS/2 impact

System purchase plans



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Wang exec: Integration keys micro strategy

Wang Laboratories, Inc. introduced its Wang Professional Computer in May 1982, nine months after the debut of the IBM Personal Computer. In 1985, Wang announced the Advanced Professional Computer, its first machine based on Intel Corp.'s 80286 microprocessor.

Although both systems were well-received, one drawback was that they were not fully compatible with the IBM PC. But in May of this year, Wang announced its first fully IBM PC-compatible systems: the 80286-based Professional Computer 280 and the Intel 80386-based Professional Computer 380.

Win Burke, Wang's director of desktop systems, recently discussed the company's microcomputer strategy with *Computerworld* senior writer David Bright.

Seeing as Wang may still be best known for its word processing systems and, financially, the company has been on a roller-coaster ride for the past couple of years, why should corporations buy personal computers from Wang?

It is true that Wang was well-known as a word processing company, but over the past several years, Wang has expanded its product line and its product capabilities significantly to include not only office automation but also a number of data processing capabilities. Wang is in the systems business, playing as a systems vendor, not a PC vendor. Our primary business is to provide integrated departmental productivity systems based on our VS superminicomputer.

Win Burke

What is the level of integration between Wang's Professional Computers and VS systems? Do the Professional Computers basically function as terminals for the systems, or are they more closely linked with virtual disk and other capabilities?

They are already more closely integrated than that. And our

Continued on page 33

Inside

- Laser Digital adds 386-based micro. Page 36.
- The Software Link rolls out multiuser, multitasking PC operating system. Page 36.

Afraid to modify your old mainframe applications? Unlock their potential with VS COBOL Workbench.

The unique testing tools of VS COBOL Workbench help you to understand programs you have never seen before or that have grown complicated.

In one product: ANIMATOR for source code debugging, STRUCTURE ANIMATOR for displaying the structure of your programs and debugging at the structure level, ANALYZER for path and performance analysis, SESSION RECORDER for regression testing. These tools make maintenance not only easy, but fun.

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XM Memory Extender
Combined with our 32 bit architecture, XM allows you to break the 640K barrier imposed by DOS. Run your VS COBOL Workbench programs in protected mode and switch to real mode for DOS services.

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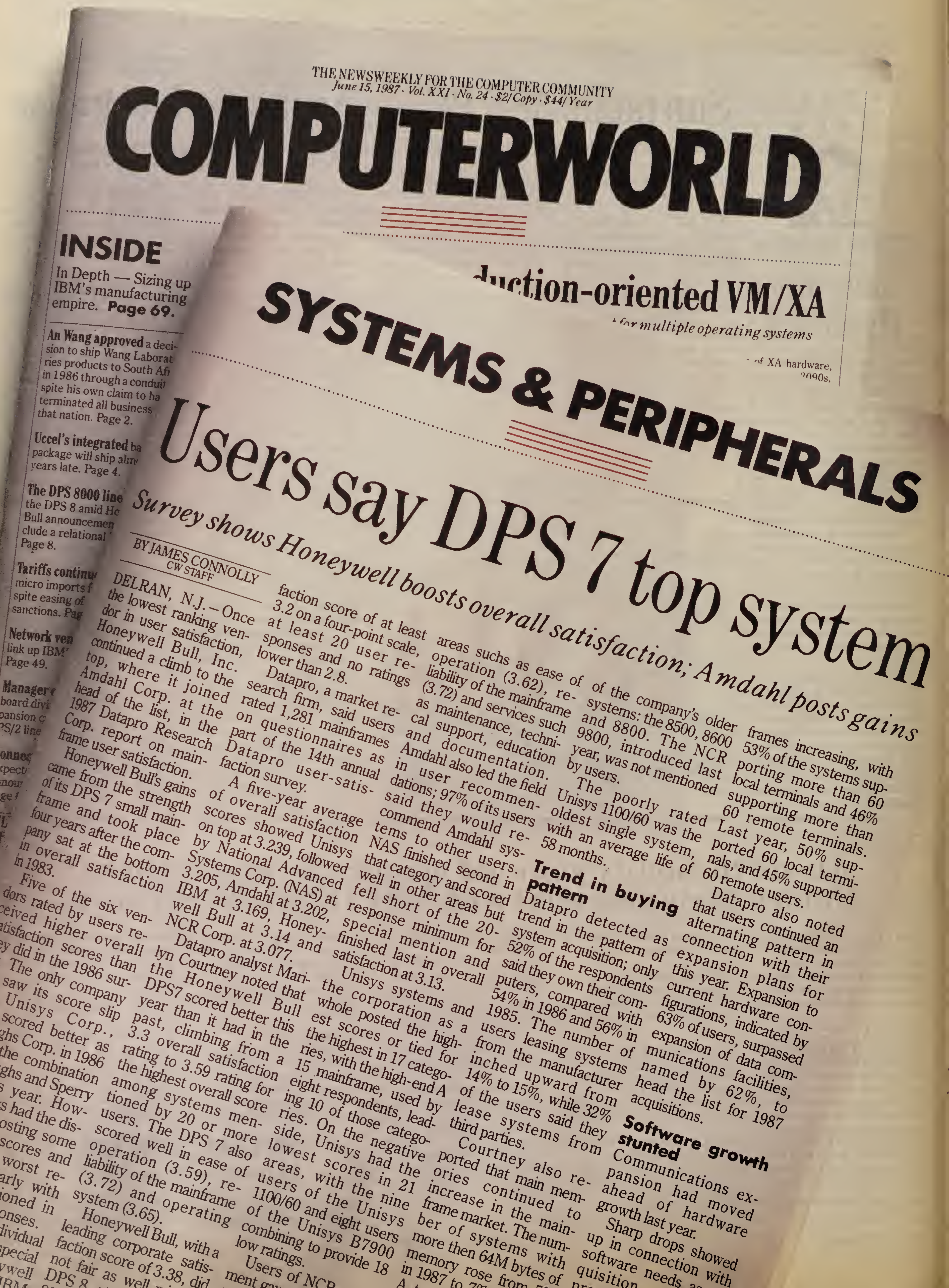

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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COMPUTERWORLD

INSIDE

In Depth — Sizing up IBM's manufacturing empire. **Page 69.**

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SYSTEMS & PERIPHERALS

Users say DPS 7 top system

Survey shows Honeywell boosts overall satisfaction; Amdahl posts gains

BY JAMES CONNOLLY
CW STAFF

DELRAN, N.J. — Once the lowest ranking vendor in user satisfaction, Honeywell Bull, Inc. continued a climb to the top, where it joined Amdahl Corp. at the head of the list, in the 1987 Datapro Research Corp. report on mainframe user satisfaction.

Honeywell Bull's gains came from the strength of its DPS 7 small mainframe and took place four years after the company sat at the bottom in overall satisfaction in 1983.

Five of the six vendors rated by users received higher overall satisfaction scores than they did in the 1986 survey. The only company
at saw its score slip
as Unisys Corp.,
ich scored better as
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faction score of at least 3.2 on a four-point scale, at least 20 user responses and no ratings lower than 2.8.

Datapro, a market research firm, said users rated 1,281 mainframes on questionnaires as part of the 14th annual Datapro user-satisfaction survey.

A five-year average of overall satisfaction scores showed Unisys on top at 3.239, followed by National Advanced Systems Corp. (NAS) at 3.205, Amdahl at 3.202, IBM at 3.169, Honeywell Bull at 3.14 and NCR Corp. at 3.077.

Datapro analyst Marilyn Courtney noted that the Honeywell Bull DPS7 scored better this year than it had in the past, climbing from a 3.3 overall satisfaction rating to 3.59 rating for the highest overall score among systems mentioned by 20 or more users. The DPS 7 also scored well in ease of operation (3.59), reliability of the mainframe (3.72) and operating system (3.65).

Honeywell Bull, with a leading corporate satisfaction score of 3.38, did not fair as well

areas suchs as ease of operation (3.62), reliability of the mainframe (3.72) and services such as maintenance, technical support, education and documentation.

Amdahl also led the field in user recommendations; 97% of its users said they would recommend Amdahl systems to other users. NAS finished second in that category and scored well in other areas but fell short of the 20-response minimum for special mention and finished last in overall satisfaction at 3.13.

Unisys systems and the corporation as a whole posted the highest scores or tied for the highest in 17 categories, with the high-end A 15 mainframe, used by eight respondents, leading 10 of those categories. On the negative side, Unisys had the lowest scores in 21 areas, with the nine users of the Unisys 1100/60 and eight users of the Unisys B7900 combining to provide 18 low ratings.

Users of NCR
ment

of the company's older systems: the 8500, 8600 and 8800. The NCR 9800, introduced last year, was not mentioned by users.

The poorly rated Unisys 1100/60 was the oldest single system, with an average life of 58 months.

Trend in buying pattern

Datapro detected a trend in the pattern of system acquisition; only 52% of the respondents said they own their computers, compared with 54% in 1986 and 56% in 1985. The number of users leasing systems from the manufacturer inched upward from 14% to 15%, while 32% of the users said they lease systems from third parties.

Courtney also reported that main memories continued to increase in the mainframe market. The number of systems with more then 64M bytes of memory rose from
in 1987 to
A

frames increasing, with 53% of the systems supporting more than 60 local terminals and 46% supporting more than 60 remote terminals. Last year, 50% supported 60 local terminals, and 45% supported 60 remote users.

Datapro also noted that users continued an alternating pattern in connection with their expansion plans for this year. Expansion to current hardware configurations, indicated by 63% of users, surpassed expansion of data communications facilities, named by 62%, to head the list for 1987 acquisitions.

Software growth stunted

Communications expansion had moved ahead of hardware growth last year.

Sharp drops showed up in connection with software needs
quisition

You said it, not us.

Nothing beats word of mouth advertising. And the word being spoken by users of Honeywell Bull systems is "satisfaction."

In a recent Datapro Research Corp. report, Honeywell Bull scored highest in overall user satisfaction.

Not second highest, or third highest.

Highest.

Period.

And users gave our DPS 7 mid-range computer high marks for its ease of operation and reliability. They also praised its operating system, GCOS 7, that allows it to perform a wide range of functions, such as high-volume transaction processing, office applications, sophisticated networking and communications, and program development. In short, they rated the DPS 7 the best system available.

Again, not second best or third best.

The best.

For months now, we've been telling you that, to Honeywell Bull, customers are more important than computers. That means we don't develop technology for technology's sake. We develop reliable systems that solve problems. And we don't give lip service from 9 to 5. We give prompt service 24 hours a day, anywhere in the world.

Apparently, that philosophy has paid off. Because the same customers that we put first, have now put us *in* first.

Honeywell Bull

Customers are more important than computers.

Sun PC

FROM PAGE 29

based PC as a proactive response to IBM and Compaq Computer Corp., the source said, noting that the firm is worried about being put on the defensive in the low end of its market.

Bob Herwig, an analyst at Hambrecht & Quist, Inc., said debate between Sun's East Coast and West Coast operations on the virtues of adding a 386-based machine to its lineup has only recently been resolved in favor of releasing the product.

The final decision, Herwig said, was delayed as Sun management examined the necessity of having a bridge product for desktop commercial users and whether diluting the firm's Unix purity with a product that features an operating system running Microsoft Corp. MS-DOS applications made any sense. Sun was also deciding how to position the product during the ongoing controversy over Microsoft's MS OS/2 vs. MS-DOS.

"The mindset of the technical people in Sunnyvale is that they tend to sneer at anything but Unix. It does appear that the marketing mentality has won out," Herwig said.

The 386-based micro would be Sun's first machine powered by an Intel microprocessor and would place the firm in direct competition with high-end microcomputers offered by IBM, Compaq Computer Corp. and other PC vendors.

The machine, expected to be priced at less than $7,500 with a 40M-byte hard drive and a high-resolution monitor, would be pitted against IBM's Personal System/2 Model 80 and Compaq's Deskpro 386 in many upcoming competitive bids placed by power users.

The Sun system is being developed under the code name Roadrunner at Sun's Billerica operation, analysts and users familiar with the firm's plans said.

Roadrunner, sources said, would leverage the firm's traditional strengths in the Unix operating system, emphasizing Unix's inherent multitasking capabilities and networking via its open systems architecture Network File System.

Sun's timing in the 80386 market could be fortuitous, analysts said, since Roadrunner would provide true multitasking before both IBM and Compaq. Multitasking for the PS/2 line and Compaq micros is tied to the availability of MS OS/2, which is scheduled to be available in bare-bones form by the end of the first quarter of 1988.

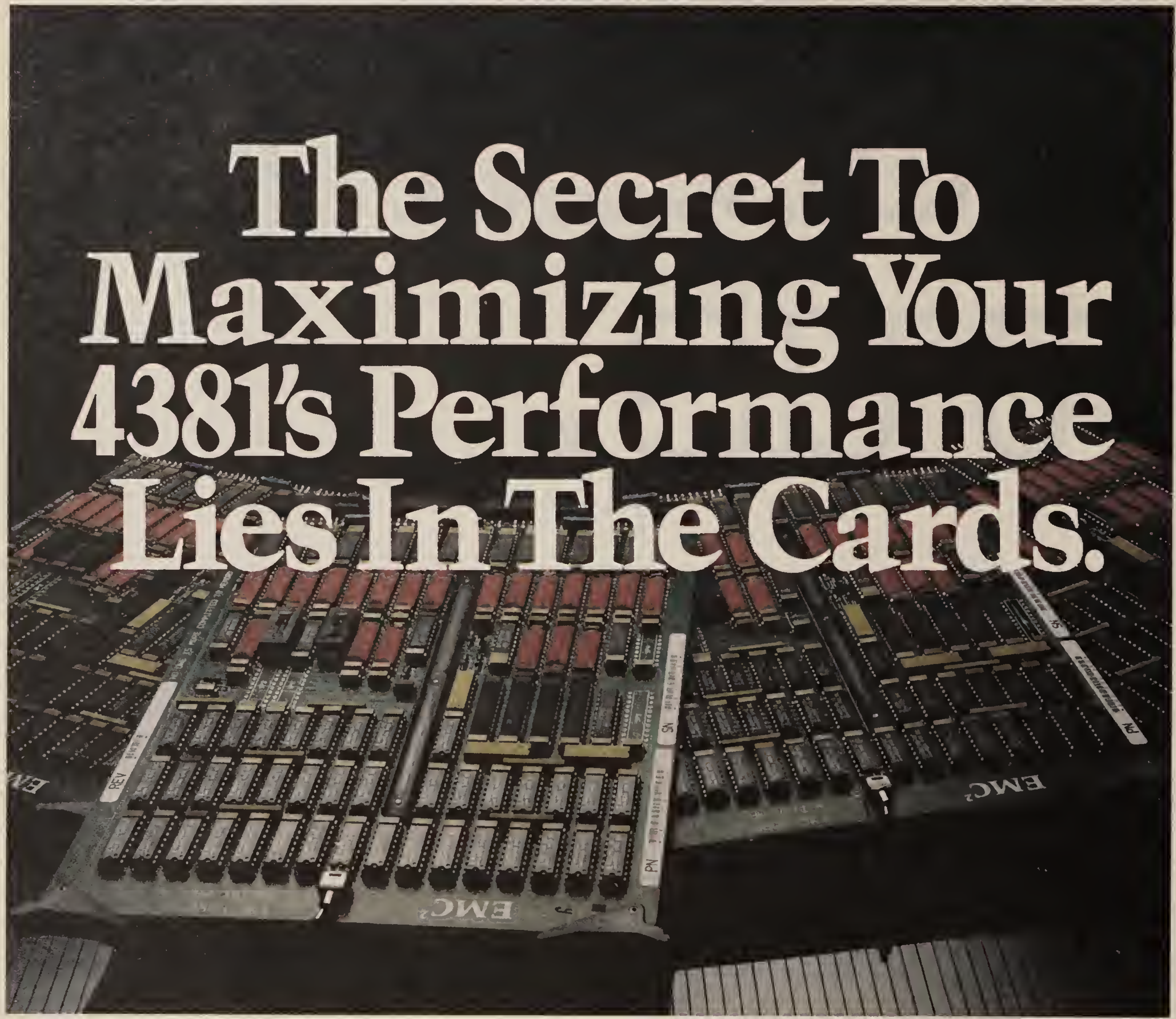
IBM's OS/2 Extended Edition, which is intended to provide data base management and built-in micro-to-mainframe communications capability, is not expected until mid- to late 1989. IBM has said it would not disclose Extended Edition's availability until later this year.

Any slippage in the availability of MS OS/2 and extensions from IBM or third-party vendors could prove to be a boon for Sun, analysts said.

"They would be offering a microcomputer with multitasking that is here today," said one West Coast analyst who requested anonymity. The ever-increasing portfolio of applications for Unix could also boost Sun's fortunes in the 386 arena.

Roadrunner would strengthen Sun's growing following within the financial services business, observers said. Sun workstations have caught on in the last year in the financial community because of their multitasking operations, open systems networking and expert systems development capabilities.

Sun's family of technical workstations have primarily been designed around the 68000 microprocessors, although its most recent product line, the Sun 4, uses a proprietary reduced instruction set microprocessor.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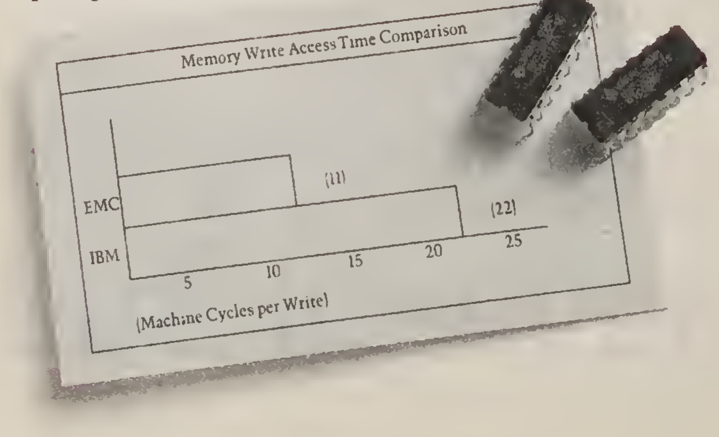

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Wang

CONTINUED FROM PAGE 29

strategy is, over a period of time, to enhance that integration to the point where, eventually, we will have a totally transparent systems environment in which personal productivity would be so well integrated they would appear to be part of the same systems environment.

I can assure you that over the next few months and [the next] year, we're going to be significantly enhancing the level of integration. There will be software and hardware enhancements.

So your typical customers already have VS minicomputers?

First of all, I'd say that almost every corporation has VS superminicomputers. It's a safe bet to say that our existing customer base is our most attractive prospect for our PC product line.

Why did it take Wang so long to provide full IBM PC compatibility in its systems?

First of all, when we introduced our product, the Professional Computer, there was no de facto standard. IBM had just introduced its product; our design was done in parallel to the IBM PC design. We had a number of advanced design features in the initial design of the PC, including things like channel I/O architecture, which IBM, of course, has endorsed with its recent Personal System/2 announcement. Over a period of time, our customer base found our existing PC product line quite attractive for the application environments in which our products were being sold.

It did become clear that there was some polarization within the market and in our own customer base. We received increasing numbers of requests to provide 100%-compatible products. So about 18 months ago, we kicked off a major project to address that set of customer needs.

Will Wang offer systems that are compatible with the IBM PS/2?

The PS/2 is not a single product line or a single set of features. First of all, the PS/2 has two separate bus architectures. The Model 25 and Model 30 are really IBM PC XT-based bus systems, whereas the Model 50 and above are Micro Channel-based systems. They really aren't the same system at all, or part of the same product line at all from a technical point of view.

We feel that the IBM PC AT bus is already the de facto standard in that segment of the market, and there's no reason for us to regress to a lower performance bus.

We believe that it will be some period of time before the Micro Channel architecture reaches the same de facto standard status as the AT bus. So there will be increased demand for AT bus-based systems. We are committed to providing industry-standard platforms as VS workstations, and hence, if that is the industry standard, we'll certainly address that need.

Hypercard

CONTINUED FROM PAGE 29

things that are in some way similar to it. By looking at how it is both similar to — yet different from — known objects, we come to understand the new object.

Hypercard is constructed to resemble known objects, the metaphor being stacks of cards that the user may browse through. In the simplest sense, this means going through a collection of cards in sequence.

Card tricks

Individual cards displayed on the screen can include both multifont text and graphics. In the simplest form, the user might go through a stack of cards on some subject like reading sequentially through the pages of a book. Typically, the user will use the mouse with forward and backward pointing arrows on the card currently displayed to move forward and backward through the stack.

Buttons can be defined to do almost anything. Moving a card in the stack forward or backward is one of the simplest things buttons can do. A button may be defined to move to a table of contents or an index. Buttons defined in an index may move to a topic. In fact, buttons can move to any card in any stack, initiate processes, generate sounds, do calculations and a lot more.

For hard-core digital macho types, Hypercard may be viewed from a completely different perspective because underlying Hypercard is a very powerful command language: Hypertalk. Hypertalk is nothing less than a powerful procedural command language for the Macintosh. What Hypercard buttons actually do when pushed is to initiate sequences of Hypertalk commands.

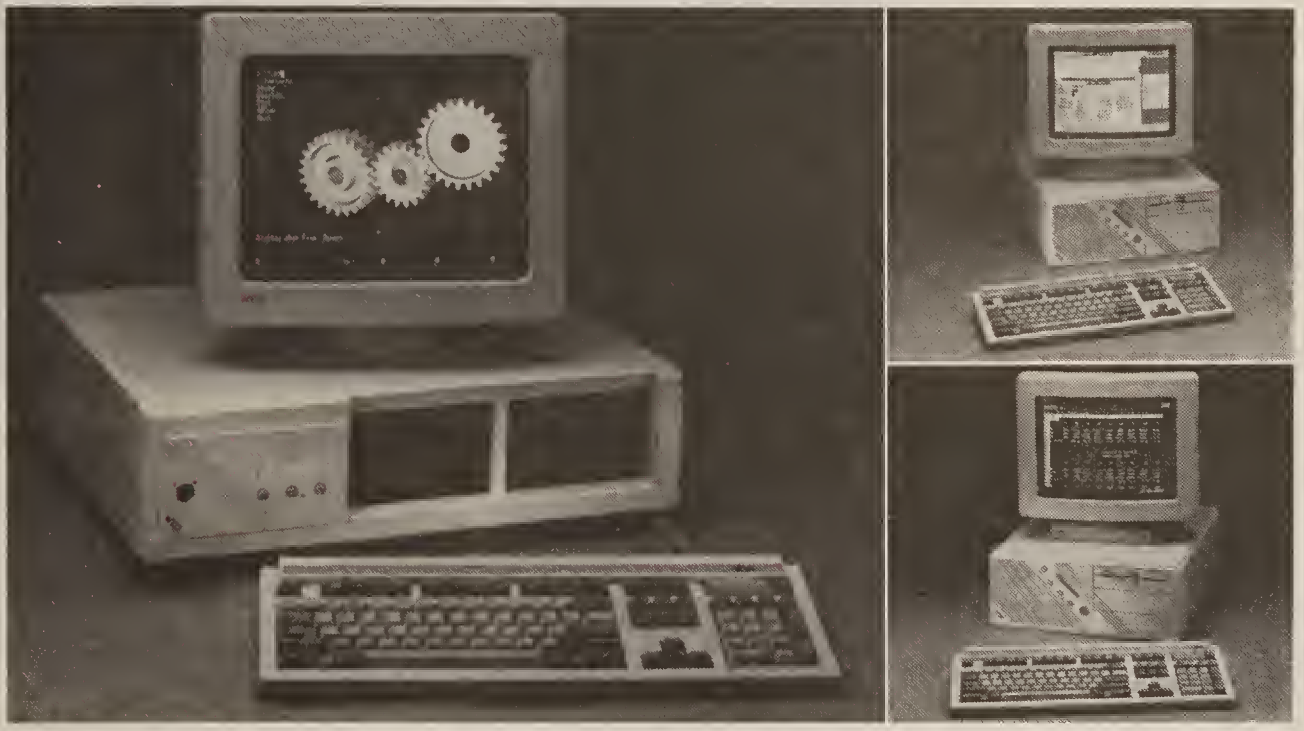
Every button has a Hypertalk script associated with it. This is a sequence of Hypertalk commands. Hypertalk includes, for example, control structures such as "if . . . then . . . else," "repeat for" and "repeat while."

Hypercard convincingly demonstrates that Apple hasn't lost the innovative edge that characterized the Macintosh from the start. The Mac may never become the standard of corporate personal computing, but Hypercard certainly offers yet another convincing reason to take the Macintosh seriously as an alternative to the more widely used IBM and compatible systems in business.

Zachmann is vice-president of research at International Data Corp.

C O M P U T E R S

Grow Power.



The New WYSEpc 386 and New 286 models are designed for speed, power and upgradability.

WYSE's Modular Systems Architecture gives the new WYSE PCs power to grow. In addition to being able to add a number of storage peripherals, a variety of board products can be plugged into the bus.

All the new systems include a 1.2 MB diskette and hard drive controller, MS.DOS 3.2 operating system with enhanced features and GW Basic 3.2. They also feature the WYSE Window system status display which indicates important system messages, disk activity, system performance, date, time, and processor speed.

The WYSEpc 386 Model 3216 utilizes the 32-bit 80386 CPU chip operating at 16 MHz with zero wait-states. A dedicated 32-bit memory bus provides fast access to up to three memory cards expandable up to 6MB RAM. Other features include: six PC AT-compatible accessory slots; four 16-bit slots, two 8-bit slots (one half-size).

The WYSEpc 286 Model 2108 has a 16-bit 80286 processor running at 8 MHz with 512K of memory. It features seven PC AT-compatible accessory slots; five 16-bit slots, and two 8-bit slots.

The WYSEpc 286 Model 2112 has a 12.5 MHz CPU with one wait-state, 1MB memory, and seven PC AT-compatible accessory slots. Model 2214 features 1MB of fast, true-zero wait-state memory, and expanded memory addressing through software emulation. It also has nine PC AT-compatible accessory slots.

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Alabama: 205/830-9526 Wisconsin: 414/785-5500 Colorado: 303/799-8525 Arizona: 602/431-0016
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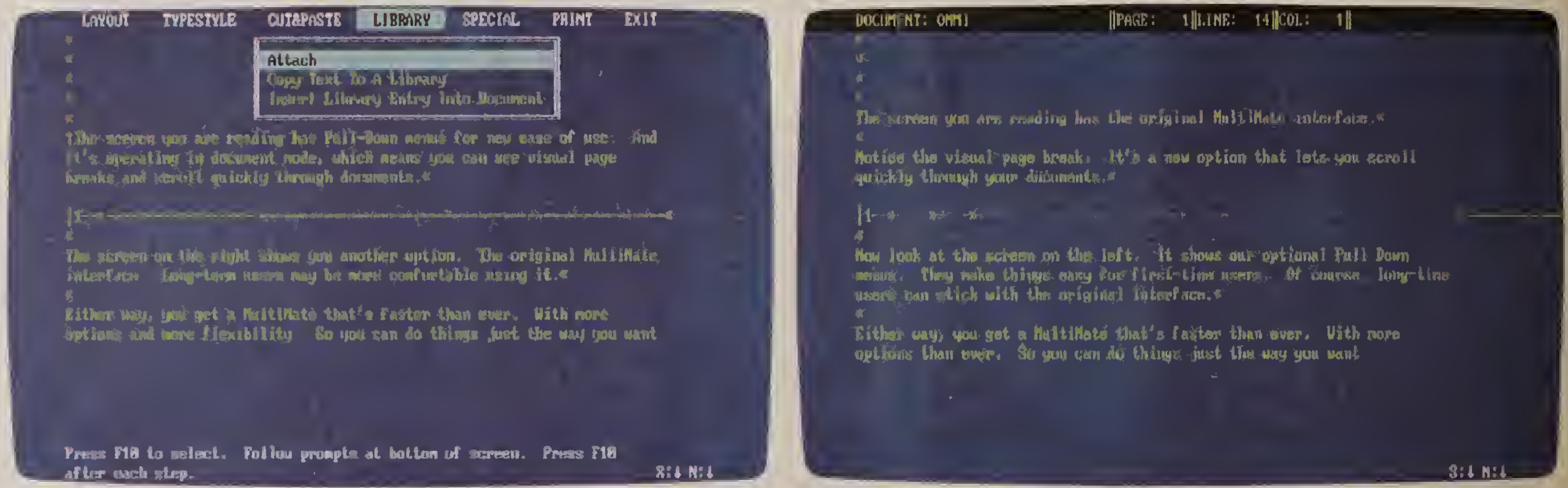
New MultiMate.
feature is lots

Option one is a new pull-down menu interface. Now even beginners can easily access all the word processing power of MultiMate Advantage II.™

Option number two is the original MultiMate® interface. Still there for all those who have come to appreciate its power.



```
LAYOUT   TYPESTYLE   CUT&PASTE   LIBRARY   SPECIAL   PRINT   EXIT
                     Attach
                     Copy Text To A Library
                     Insert Library Entry Into Document

The screen you are reading has Pull-Down menus for new ease of use.  And
it's operating in document mode, which means you can see visual page
breaks and scroll quickly through documents.«

|1-------------------------------------------------------------------«
«
The screen on the right shows you another option.  The original MultiMate
interface.  Long-term users may be more comfortable using it.«
«
Either way, you get a MultiMate that's faster than ever.  With more
options and more flexibility.  So you can do things just the way you want

Press F10 to select.  Follow prompts at bottom of screen.  Press F10
after each step.                                              S:1 N:1
```

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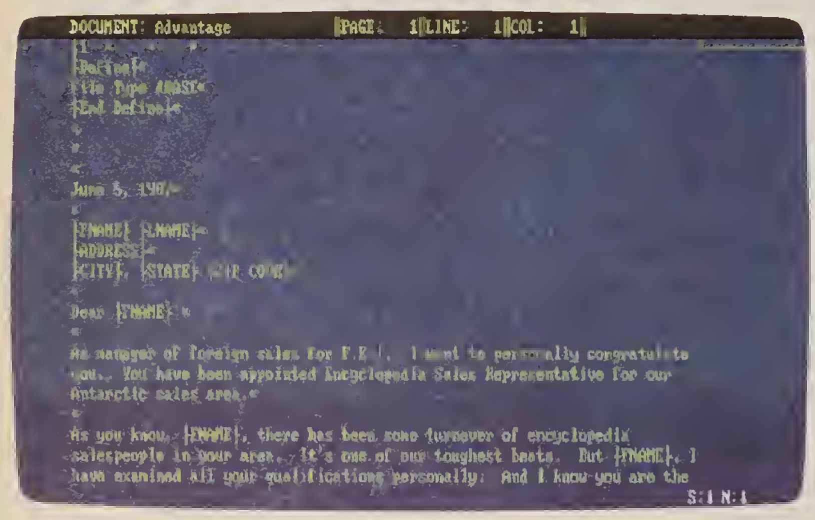
DOCUMENT: OMM1                  ||PAGE:   1||LINE:  14||COL:   1||
«
«
«
«
The screen you are reading has the original MultiMate interface.«
«
Notice the visual page break.  It's a new option that lets you scroll
quickly through your documents.«

|1--»    »»  »«
«
Now look at the screen on the left.  It shows our optional Pull Down
menus.  They make things easy for first-time users.  Of course, long-time
users can stick with the original interface.«
«
Either way, you get a MultiMate that's faster than ever.  With more
options than ever.  So you can do things just the way you want
                                                              S:1 N:1
```

Now virtually anybody can use MultiMate for word processing tasks large or small. Pull-down menus make it easy. And the original interface is only a few keystrokes away.

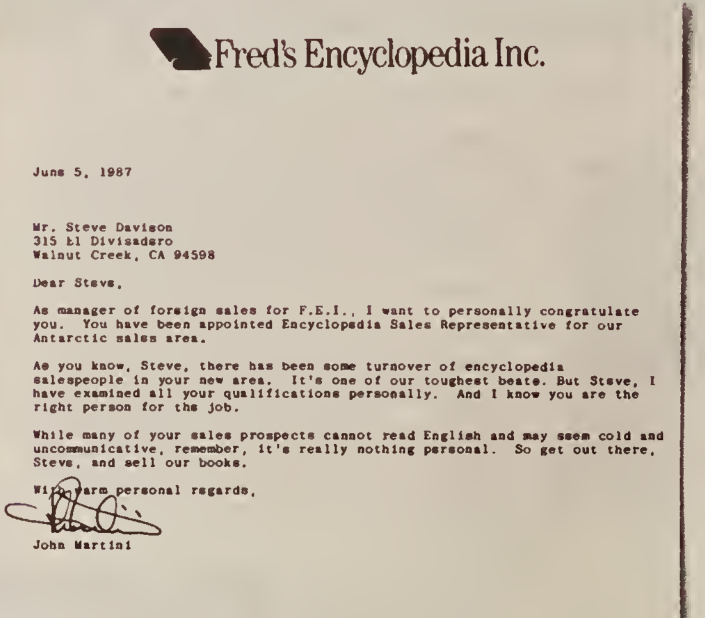
There's even the option of having no menus at all. Our new Hot Start/Hot Print bypasses menus, letting users create, edit and print short memos within seconds of booting up.



```
DOCUMENT: Advantage             ||PAGE:   1||LINE:   1||COL:   1||
|1
|Define|«
|File Type dBASE|«
|End Define|«
«
«
«
June 5, 1987«
«
|FNAME| |LNAME|«
|ADDRESS|«
|CITY|, |STATE| |ZIP CODE|«
«
Dear |FNAME|:«
«
As manager of foreign sales for F.E.I., I want to personally congratulate
you.  You have been appointed Encyclopedia Sales Representative for our
Antarctic sales area.«
«
As you know, |FNAME|, there has been some turnover of encyclopedia
salespeople in your area.  It's one of our toughest beats.  But |FNAME|, I
have examined all your qualifications personally.  And I know you are the
                                                              S:1 N:1
```

Now just typing "file type dBASE" directly merges dBASE files with MultiMate. That means any of your people can create personalized form letters with ease.

And if your people are using dBASE,® MultiMate Advantage II gives them a tremendous advantage. Because now they can easily merge dBASE files directly into MultiMate documents—without leaving MultiMate.



Fred's Encyclopedia Inc.

June 5, 1987

Mr. Steve Davison
315 El Divisadero
Walnut Creek, CA 94598

Dear Steve,

As manager of foreign sales for F.E.I., I want to personally congratulate you. You have been appointed Encyclopedia Sales Representative for our Antarctic sales area.

As you know, Steve, there has been some turnover of encyclopedia salespeople in your new area. It's one of our toughest beats. But Steve, I have examined all your qualifications personally. And I know you are the right person for the job.

While many of your sales prospects cannot read English and may seem cold and uncommunicative, remember, it's really nothing personal. So get out there, Steve, and sell our books.

With warm personal regards,

John Martini

We also have 13 easy conversions with today's most popular business software, including WordStar.® Plus a direct import capability that lets you bring ASCII files directly and transparently into your users' MultiMate documents.

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MultiMate Advantage II is also on excellent speaking terms with your mainframe because a new IBM® DCA® conversion provides Final Form Text and Revised Form Text support.

As far as printers go, you've got all the options in the world. Designed with lasers in mind, MultiMate Advantage II supports more than 25 laser printers and even addresses the dual cartridges in the HP Laserjet Series II.™ In all, there's support for over 400 printers—more than any other program.

Here are four out of over four hundred printers supported by the new MultiMate Advantage II. And that includes all the latest lasers.

And if you really want options, take a look at your fonts. You get up to 26 per document with automatic font downloading and font switching.

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ADVANTAGE
II

That's more than anybody else gives you.

We even give you more options in manuals. "MultiMate in Minutes" helps your novice users get up to speed quickly. Experienced users can use our "Advanced Topics" manual. And no matter what their level of sophistication, they can always rely on Ashton-Tate's technical and customer support.

So contact your Ashton-Tate representative for a demonstration of all the new MultiMate Advantage II options (For upgrades, call 800/367-8126).

After that, you may conclude there's only one option left.

To buy it.

ASHTON·TATE®

NEW PRODUCTS

Systems

Laser Digital, Inc. has announced the **Pacer 386**, an Intel Corp. 80386-based microcomputer.

The Pacer is said to have a clock speed of 16 MHz. It incorporates 512K bytes of random-access memory on the main board, which can be expanded to 8M bytes via 32-bit expansion boards. Features include eight full-length expansion slots, a 200W power supply, a real-time clock/calendar on the motherboard, an enhanced IBM Personal Computer AT-style keyboard and Microsoft Corp. MS-DOS. Options include a 1.2M-byte floppy drive and a choice of hard disk drives with capacities of up to 100M bytes.

A Pacer 386 with a 40M-byte hard disk, a 1.2M-byte floppy drive, a monochrome monitor and a graphics card costs $4,695.

Laser Digital, 1024 Morse Ave., Sunnyvale, Calif. 94086.

Software utilities

A multiuser, multitasking operating system for Intel Corp. 80386-based personal computers has been introduced by **The Software Link, Inc.**

PC-MOS/386 is said to be able to manage memory-intensive applications even though its kernel occupies only 128K bytes of memory.

The product supports 32-bit native mode and the virtual Intel 8086 mode that allows support and control of multiple 8086-compatible applications or tasks, the vendor said.

All versions support record and file locking, print spooling, remote modem access and multilayer security, according to The Software Link.

PC-MOS/386 is available in a single-user version for $195, a five-user version for $595 and a 25-user version for $995.

The Software Link, Suite 632, 8601 Dunwoody Place N.E., Atlanta, Ga. 30338.

Development tools

Multitasking development software that combines Basic and Ladder Logic and runs both languages concurrently on the same Bitbus board has been announced by **Robanks, Inc.**

Basic and Ladder Development Software was written to execute on any Bitbus 8044-based core. Features include a token interpreter that forms the execution vehicle for Basic; screen-oriented menus; on-line editing of both Basic and Ladder programs developed on the host personal computers; and an interactive compiler and debugger.

Each remote Bitbus card executes its own Basic/Ladder program. Up to 10 slave remote boards may be cascaded.

The software costs $1,995.

Robanks, P.O. Box 493, Banks, Ore. 97106.

Software enhancements

Target Software, Inc. has upgraded its Maclighting spell-checker for the Apple Computer, Inc. Macintosh and changed the product's name to **Mentor.**

Mentor comes with an abridged version of the Merriam-Webster, Inc. 100,000-word Ninth New Collegiate Dictionary. A second version, called Mentor Plus, includes the Merriam-Webster 75,000-word Pocket Dictionary, complete with definitions.

Features include automatic and manual hyphenation, no limit to characters that may be added to the dictionary, a checking speed of 140 word/sec. and network compatibility.

Mentor costs $99.95. Mentor Plus costs $199.95.

Target Software, 14206 S.W. 136th St., Miami, Fla. 33186.

Data storage

CSSL, Inc. has introduced the **Awesome I/O Card**, a hard-disk subsystem designed to eliminate I/O logjams in IBM Personal Computer ATs and compatibles.

The card is said to double disk capacity and decrease average access time. According to the vendor, the proprietary design intercepts and stores commonly used data from the disk. The card contains a solid-state disk accelerator and is socketed to allow an additional 256K or 512K bytes of nonvolatile CMOS random-access memory for disk acceleration.

The Awesome I/O Card costs $595.

CSSL, 909 Electric Ave., Seal Beach, Calif. 90740.

Board-level devices

The **Smartpanel/368**, a single personal computer board designed to provide users of Texas Instruments, Inc. S600 and S800 computers with a time-of-day clock, has been announced by **Houston Computer Services, Inc.**

The board automatically sets the operating system's date and time every time the system is booted.

According to the vendor, the correct date and time are stored in the Smartpanel module itself, backed up by an integrated battery.

The Smartpanel/368 is priced at $399.

Houston Computer Services, Suite 200, 11001 S. Wilcrest Drive, Houston, Texas 77099.

Nixdorf tames the data entry tiger.

There was a time when it was enough just to be able to capture data. Now, the premium is on speed, flexibility and easy maintainability.

The faster and more accurately you can capture data, the faster it can be put to use by corporate management.

But capturing data exclusively from a huge centralized host system has become an expensive and unacceptably slow process. And it's getting harder and harder to find new ways to skin the cat. Especially if the cat's a big one, and it decides to resist.

Nixdorf's answer to the problem is to reduce the size of the tiger: we can help you complement your host systems with one or more subsidiary distributed systems. By breaking the problem down into manageable parts, Nixdorf's system permits departmental data capture, which makes you faster and more valuable to management.

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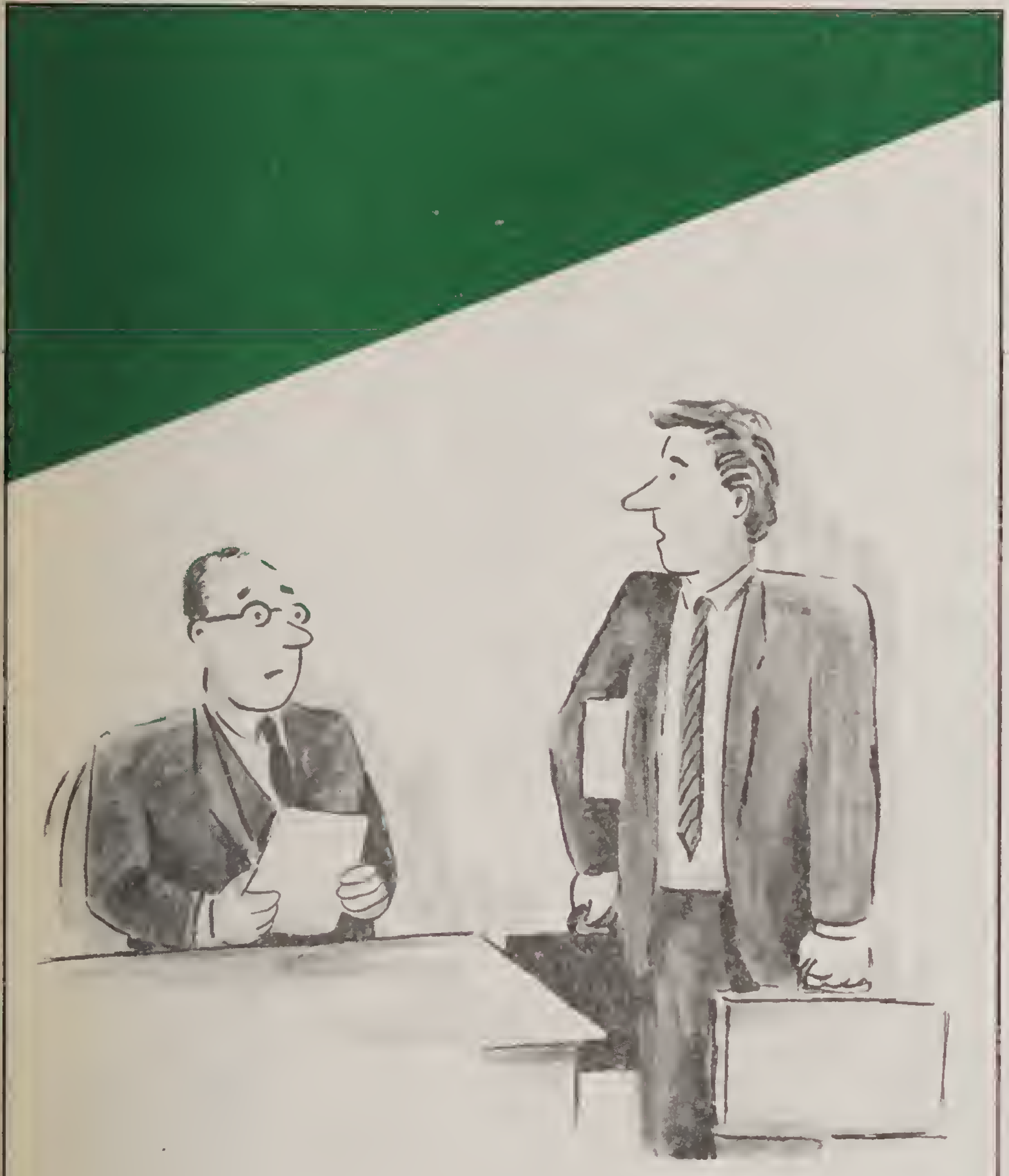

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NETWORKING

DATA STREAM

Mark Freund

Top-down LAN planning

Recently, an MIS director was asked by the manager of his company's local-area network (LAN) pilot project, "Where should we begin?" His answer was typical of high-level MIS departments in large corporations: "You must begin with a plan. Initially, I would suggest a needs analysis of the end-user department, an inventory list of their existing personal computers and a facilities evaluation for cabling requirements."

Corporate MIS departments are increasingly promoting investigation and pilot implementation of new networking technologies.

However, all too often there lies a gap between management's high-level directives and the resulting research and recommendations that result from investigations conducted by their employees.

Disoriented?

Part of the problem stems directly from orientation. Upper management is often looking at the big picture — and rightly so. Their subordinates' perspective, however, is often much narrower and tends to be highly product-oriented — to everyone's misfortune.

The first and most essential

Continued on page 41

Shielding nets from disaster

Vowing self-sufficiency, McKesson switches to satellite-based system

BY JEFFRY BEELER
CW STAFF

RANCHO CORDOVA, Calif. — Bud Turner and his colleagues at McKesson Corp.'s Information Services organization have never forgotten the violent winter storm that thrashed much of Northern California 2½ years ago. The storm brought prolonged downpours and triggered extensive flooding that washed away the terrestrial communications links between the company's main data center here and its nationwide network of 100 distribution centers.

McKesson, which distributes drugs, chemicals and other products, eventually replaced the lost private lines and restored the disrupted electronic services to its in-house users. But the experience taught the company a valuable lesson about the dangers of being dependent on resources that are beyond its control and stiffened its resolve to achieve systems self-sufficiency.

In order to prevent a repetition of the flood-related disaster, the $7 billion corporation says it plans to replace its private transmission lines with a satellite communications link. McKesson is already experimenting with the idea through a pilot project that has resulted in the installation of an earth station outside its Drohan Data Center here and involves nine of the company's remote locations.

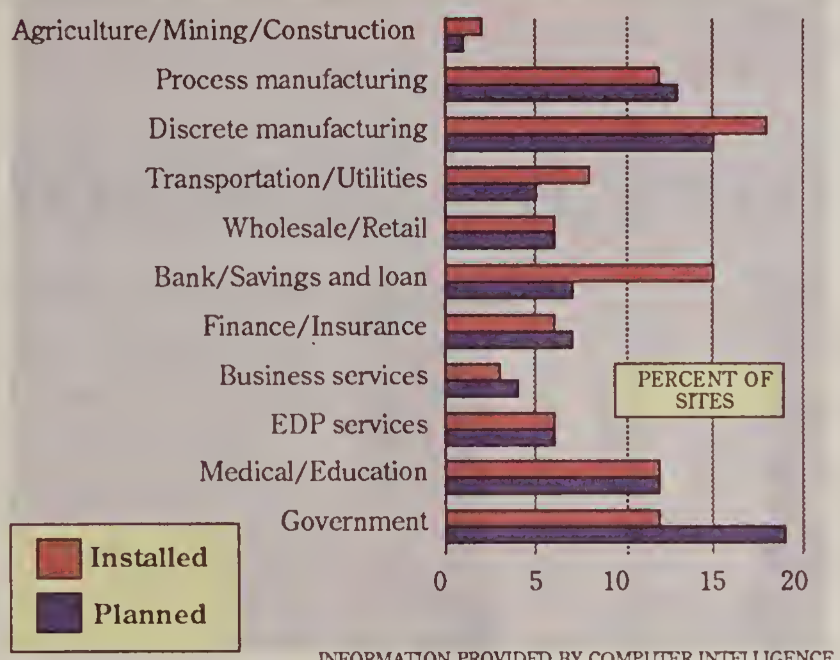
When the test is complete and the satellite network is fully implemented in early 1989, it will make the firm's internal communications significantly less susceptible to natural and man-made calamities than terrestrial

Continued on page 41

Data View

Security systems profile: breakdown by industry

Survey tracks industry sector use of call-back and encryption systems



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Mac users get TCP/IP link

BY PATRICIA KEEFE
CW STAFF

BERKELEY, Calif. — Centram Systems West, Inc. recently introduced communications software said to link users of Apple Computer, Inc.'s Appletalk network to Transmission Control Protocol/Internet Protocol (TCP/IP)-based systems.

Fourth-quarter availability is planned. Pricing has not been determined.

Unveiled at the recent Macworld Expo in Boston, TOPS Terminal for the Mac reportedly enables users of the Apple Macintosh to communicate with machines ranging from worksta-

Continued on page 39

Price cuts should up modem use

BY ELISABETH HORWITT
CW STAFF

During the last few months, vendors have quietly made $2,495 the standard price for full-duplex 9.6K bit/sec. dial-up modems. Late last month Codex Corp., one of the last holdouts, cut prices on its own 9.6K bit/sec. dial-up modems to $2,495 for the standard model and $2,745 for the same model with error correction.

"Obviously, we have to be competitive with other companies who have already cut their prices," said Peter Edelstein, manager of dial-up product marketing for the Mansfield, Mass., firm. Within the last few months, Concord Data Systems and NEC America, Inc. have also lopped $1,000 off the original $3,500 price they put on their 9.6K bit/sec. modem introductions more than a year ago.

According to a recent report by Salomon Brothers, Inc., the

Continued on page 39

Inside

- IBM enters telephone network equipment market. Page 39.
- Datanex software lets VAX, Microvax users use Hasp+. Page 42.
- Trans-M designs LAN for IBM PCs. Page 42.

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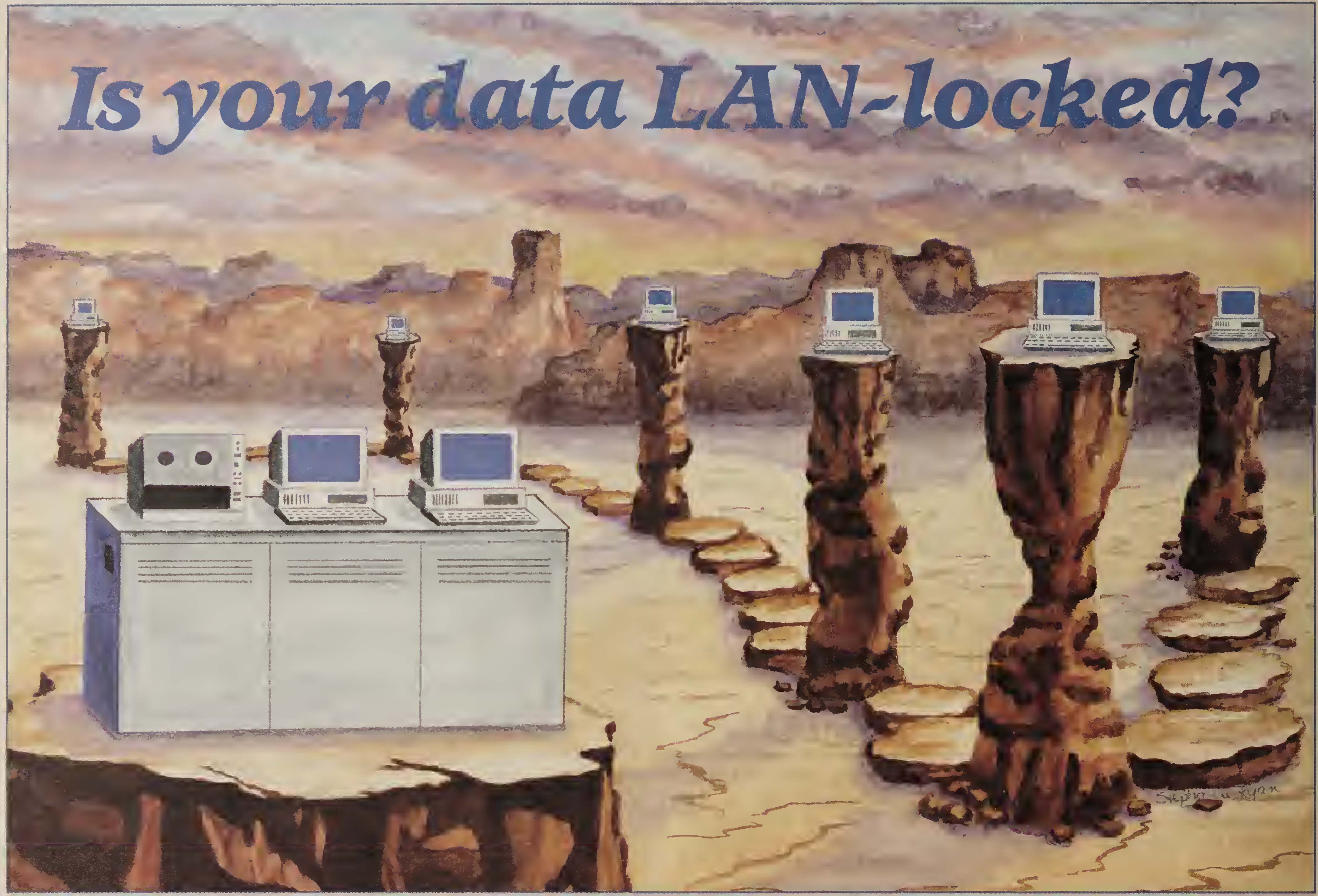

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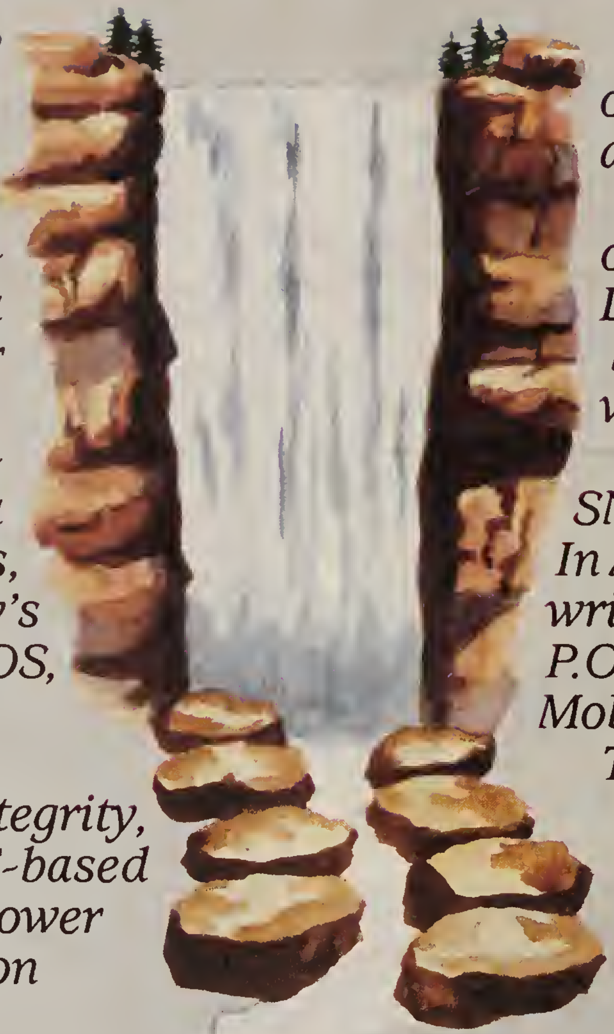

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Mac users

CONTINUED FROM PAGE 37

tions to supercomputers on the TCP/IP-based networks proliferating throughout many Fortune 1,000 companies, government agencies and academic institutions.

TOPS Terminal not only gives Apple users access to corporate host systems but does so within the context of the familiar Macintosh environment, said Nathan Goldhaber, president of Centram.

Centram, an independent subsidiary of Sun Microsystems, Inc., is the developer of TOPS, network software enabling distributed file service between Mac-, Microsoft Corp. MS-DOS-, IBM PC-DOS- and AT&T Unix-based computers.

Using TOPS Terminal, Mac users can tap the applications and file storage of any number of networked hosts simultaneously through multiple terminal-emulation windows, the vendor said. A concurrent modem connection to a remote host may also be established.

Users can run host-based applications while concurrently using a modem-based connection to commercial data bases, Unix utilities, bulletin boards and electronic mail services, the vendor said. They can also cut and paste between different terminal emulation windows.

A Mac possessing 512K bytes of random-access memory can reportedly support more than a dozen concurrent sessions.

The software supports a broad range of terminal types, including Digital Equipment Corp. VT100, VT52 and VT102 terminals. It is said to support effective terminal-to-host transmission speeds of between 7.2K and 9.6K bit/sec. The package's integrated text editor allows users to edit Unix, IBM Personal Computer and Mac text files without conversion.

Price cuts

CONTINUED FROM PAGE 37

fastest growing segment of the modem market is made up of asynchronous/synchronous modems that can support transmission rates of up to 9.6K bit/sec. over either leased or dial-up lines. Modems of this type accounted for less than $40 million, or 4% of the modem market's revenues in 1986, the report said. However, sales for such products are projected to grow to more than $300 million, or almost 20% of total modem revenues, by 1989, according to the investment consulting firm.

Codex has seen "an immediate and strong response" in sales since July 2, when it allowed its sales force to let potential customers know about the reduction, Edelstein said. However, further reductions will be necessary before the products become cost-effective for the majority of IBM Personal Computer users, he said. "Today there are far more synchronous than asynchronous applications for high-speed dial-up modems, but the PC market should emerge as a major niche for these products."

Other vendors who now offer 9.6K bit/sec. dial-up modems for $2,495 are Cermetek Microelectronics, Inc. in Sunnyvale, Calif; NEC America, Inc. in San Jose, Calif.; and Universal Data Systems, Inc. in Huntsville, Ala. Universal Data will not be shipping its modems until October, the company said.

IBM launches 9370 in central office market

IBM has become a serious contender in the intelligent telephone networking equipment market. The company recently announced a major contract to supply United Telecommunications, Inc.'s telephone companies with a combination host/local-area network configuration that will support intelligent services like enhanced call screening and call processing, a United Telecom spokesman said.

IBM 9370 mid-range processors will act as service-control points for the operating companies, housing data bases of service-related information such as call-originator profiles and routing data. The 9370s, along with the IBM System/88 fault-tolerant processors (which will act as communications front ends), will be linked over IBM Token-Ring networks.

IBM won the United Telecom contract from several vendors already firmly established in the central office equipment market: AT&T, Northern Telecom, Inc. and Digital Equipment Corp. Getting the contract not only establishes IBM in the rapidly growing central-office processing node market but also positions the vendor to influence telephone companies as to their future service offerings, according to John Walsh, managing director for Integrated Strategies Group, Inc. Part of that direction may be toward interfacing central-office 9370-based services with on-premise 9370 applications, Walsh said.

One potential area of integration is between IBM's 9370-based network-service management system and the 9370 running IBM's private network management system, Netview, Walsh suggested. This would provide users with a way to centrally manage hybrid networks that combine private lines with carrier services. The integration could take place through Signaling System 7, a telecommunications protocol that IBM has agreed to implement on the systems it develops for United Telecom.

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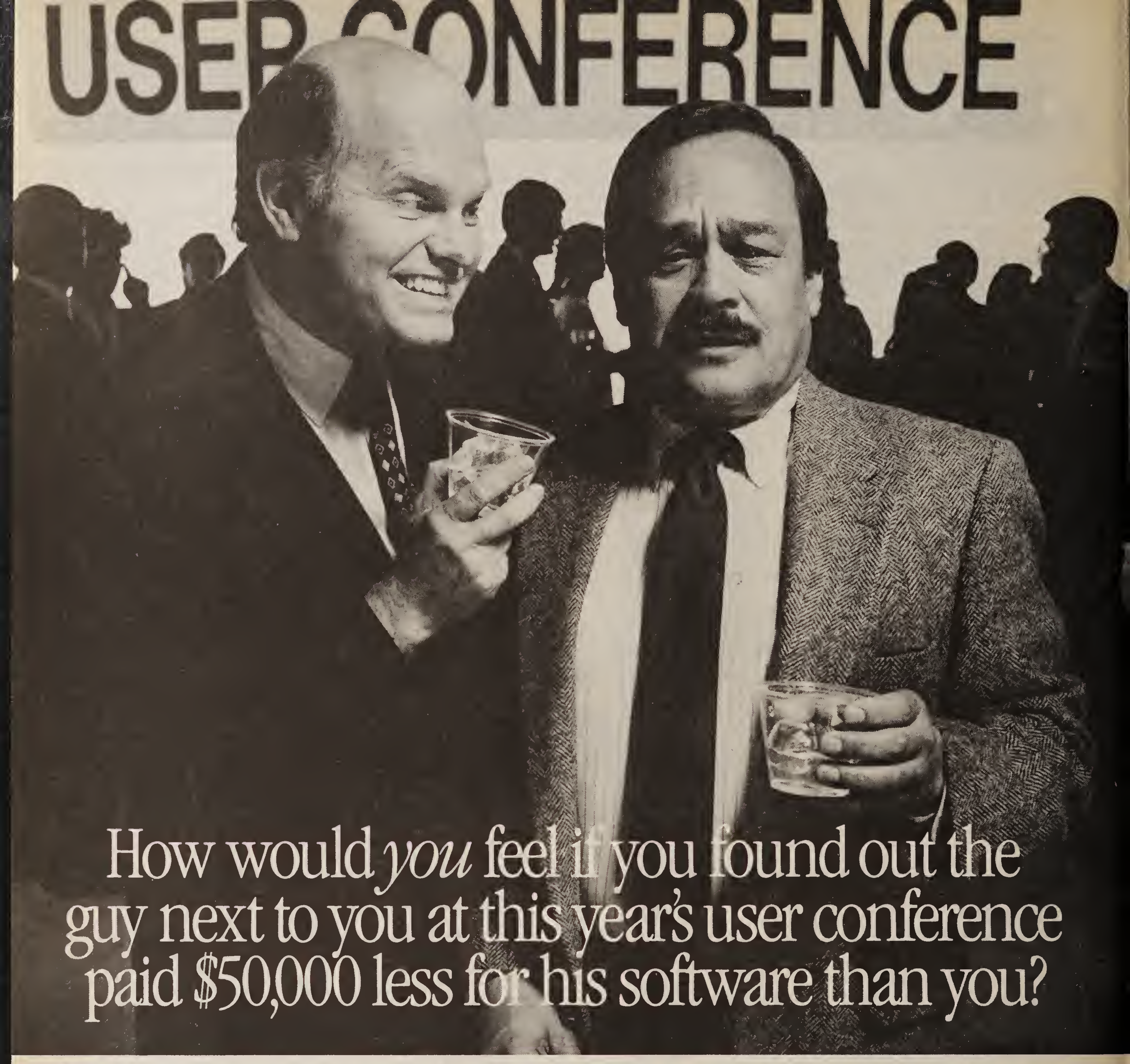

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LAN planning

CONTINUED FROM PAGE 37

step to the planning process for a LAN is for upper management to guide the project leader several steps backward, to help that person see a bigger picture. For instance, which other departments frequently interact with the one selected to receive the pilot LAN? And what existing computing resources does the pilot department currently employ? Answering questions like these will help the project leader recognize the potential magnitude of his recommendations and discourage a quick, product-oriented solution.

The next step is to become focused. Encourage the project leader to define what it is that the end-user department does functionally. An understanding of the business function is one of the most frequently ignored aspects of any system design and/or implementation, yet it is the most important. Once the business function is defined, assess how elements of automation are being utilized today and determine what some of the end users' explicit needs or desires are for automation in the future.

Now it becomes important to define and document the current automation inventory (if any) and its corresponding investment value. Remember, utilization of current investment is important.

The next step involves guiding the end user into the future. Ask "Where would you like to be in 12, 24 or 36 months?" With the results from responses and some parallel research into the LAN industry, several distinct approaches may be developed. Define two or three paths that may take the user from his current state of automation to his desired goal one to three years from now.

Plan B

User motivations may vary from complete connectivity to peripheral sharing to phasing out of existing centralized processing systems. Regardless, the development of alternative paths to migrate from today to tomorrow is important. If nothing else, they provide management with a basis on which to build, a point of reference to react to. Of equal importance, rough order-of-magnitude cost estimates can be created.

Another common question concerns how to go from a "conceptual plan" to a working, reliable system; in particular, how to deliver a LAN installation to users in a timely fashion without getting locked into poorly standardized technologies. The intermediate step is to examine the alternative paths, and select the one whose basic philosophy and approach, as well as cost/benefit ratio, best suits the organization it is serving. Then develop a phase-by-phase approach to implementing the LAN and other related automation technology.

Management wants to see good planning and physical proof that what is put on paper can also be put into their organization in a somewhat recognizable manner.

The goal here is to plan, design and then implement highly integrated, modular systems that allow flexible adaptation to dynamic corporate environments. This may be accomplished today, while maintaining 75% to 95% utilization of the initial capital investment a year or two further into the project.

Powerful LANs can provide MIS with that capability today, but only when properly planned.

Freund is a co-founder of Interconnect Consulting Group, a Pasadena, Calif., company that designs, engineers and installs networks primarily at Fortune 500 companies.

Shielding

CONTINUED FROM PAGE 37

lines, according to Turner, the data center's director.

With a satellite-based network, McKesson can maintain a network control backup facility. "We could rebuild our network simply by moving an earth station from here to our other data center in Oakland, Calif.," and reestablishing network operations from there, Turner explains. In contrast, switching to a backup data center under the company's current terrestrial configuration would involve rerouting all of the communications lines. The satellite link could also provide redundancy for the dial-up public lines that the company uses to exchange customer information between drug stores and its order-entry system.

Adoption of the satellite communications capability is only the latest and most prominent in a long series of steps McKesson has taken to duplicate its critical systems and minimize its data center's reliance on external utilities.

Some of those safeguards are somewhat unconventional. For example, McKesson is the only major corporation in the Sacramento, Calif., area with a direct fiber-optic feed from the local Pacific Bell telephone company central office.

"Usually, fiber-optic cables go from the telephone company to some central location, probably a manhole somewhere, where they then branch out to the various data centers," says John Fitzgerald, McKesson's vice-president of information services.

McKesson's penchant for systems autonomy and backup is a direct outgrowth of the nature of its business. "Ours is an inherently low profit margin industry," Turner explains, adding that the trick is to keep costs down while providing customers with top-notch, reliable service.

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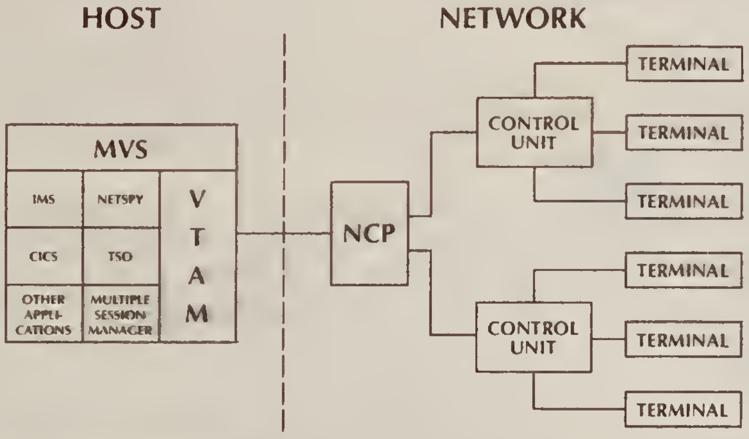

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NEW PRODUCTS

Local-area network hardware

A local-area network designed for IBM Personal Computers, PC XTs, ATs and compatibles has been announced by **Trans-M Corp.**

The **Net-127 PC** network features peer-to-peer architecture. It supports up to 127 users, linked by telephone or twisted-pair wiring. The network has device locking security features and two extra sockets on the network card that allow proprietary programming of read-only memories and the use of diskless stations.

The Net-127 can handle data transmission for user stations up to 1,000 ft apart. It supports Microsoft Corp.'s MS-DOS.

The Net-127 PC network costs $249.95 per node.

Trans-M, 28 Blacksmith Drive, Medfield, Mass. 02052.

Local-area network software

Software that allows Digital Equipment Corp. VAX and Microvax users on Decnet nodes and Vaxclusters to use **Datanex, Inc.'s** Hasp+ and EZSNA/Remote Job Entry (RJE) software has been announced by Datanex.

RJEnet uses store-and-forware techniques for file processing. Console commands can be issued through RJEnet to any host mainframe connected to the VAX. The product can reportedly support up to 50 nodes for each Hasp+ or EZnet/RJE copy.

Hasp+ allows VAX users to perform RJE and file transfers into most mainframes and minicomputers. EZSNA/RJE performs the same functions into IBM Systems Network Architecture networks.

Prices start at $1,000, including a host module for the Hasp+ or EZSNA/RJE node and support for one remote node. Expansion costs $250 per node.

Datanex, P.O. Box 1728, Eugene, Ore. 97440.

Customer-premise equipment

Dover Communications has introduced its **B-1 PAD** for users of IBM 3270 systems.

The single port B-1 packet assembler/disassembler (PAD) is compatible with X.25 networks, host PADs and front-end PAD software. It allows a single IBM 3270 access line with up to 32 devices to connect to a packet-switched network via a single X.25 line.

The B-1 PAD is priced at $2,795.

Dover Communications, Suite 966, 1412 Broadway, New York, N.Y. 10018.

Links

Epic Data, Inc. has introduced four data collection system controllers said to provide host links and party-line speeds up to 19.2K bit/sec. as well as control up to 96 terminals per party line.

The **Network Control Unit** controls up to 16 party lines of 96 terminals each at speeds up to 19.2K bit/sec. The **IVAX Controller** controls up to eight party lines of 96 terminals each.

Based on the IBM Personal Computer AT, the **Personal Computer Controller** is said to handle up to four party lines with 24 terminals each, running at up to 19.2K bit/sec. The **Host Programmable Control Unit-MC** can control up to two party lines of 24 terminals each.

Base prices range from $6,000 to $28,900.

Epic Data, 7280 River Road, Richmond, B.C., Canada V6X 1X5.

Diagnostic equipment

A personal computer-based line monitor that provides time-stamping, mnemonic display, data emulation and data recording has been announced by **Atronix, Inc.**

The **Atronix LM-1** is a software controller instrument that time-stamps every character, modem change and error. It is capable of configuring each line differently so users can receive asynchronous ASCII and transmit IBM Synchronous Data Link Control EBCDIC. They can test protocol converters and then save the data as DOS files.

The monitor provides data communications equipment and data terminal equipment simulation. It displays 1,600 readable data characters and records data directly to disk in full-duplex mode at 9.6K bit/sec.

The Atronix LM-1 line monitor costs $1,595.

Atronix, 780 Boston Road, Billerica, Mass. 01821.

Cabling

The Model 61 RS-232-to-coaxial converter, introduced by **Telebyte Technology, Inc.**, is said to alter standard data signals to provide full-duplex communication on a single coaxial line.

The Model 61 is said to sample the various control signals in the RS-232 interface and derive its power from them. Full-duplex operation is provided for transmit data and receive data at rates up to 9.6K bit/sec. over distances of 2,500 ft. A data terminal equipment/data communications equipment switch is provided to allow reversing of pins two and three of the RS-232 interface.

The Model 61 can be ordered with either a male or female DB-25 RS-232 connector. It costs $75.

Telebyte, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

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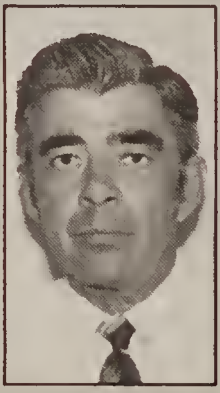

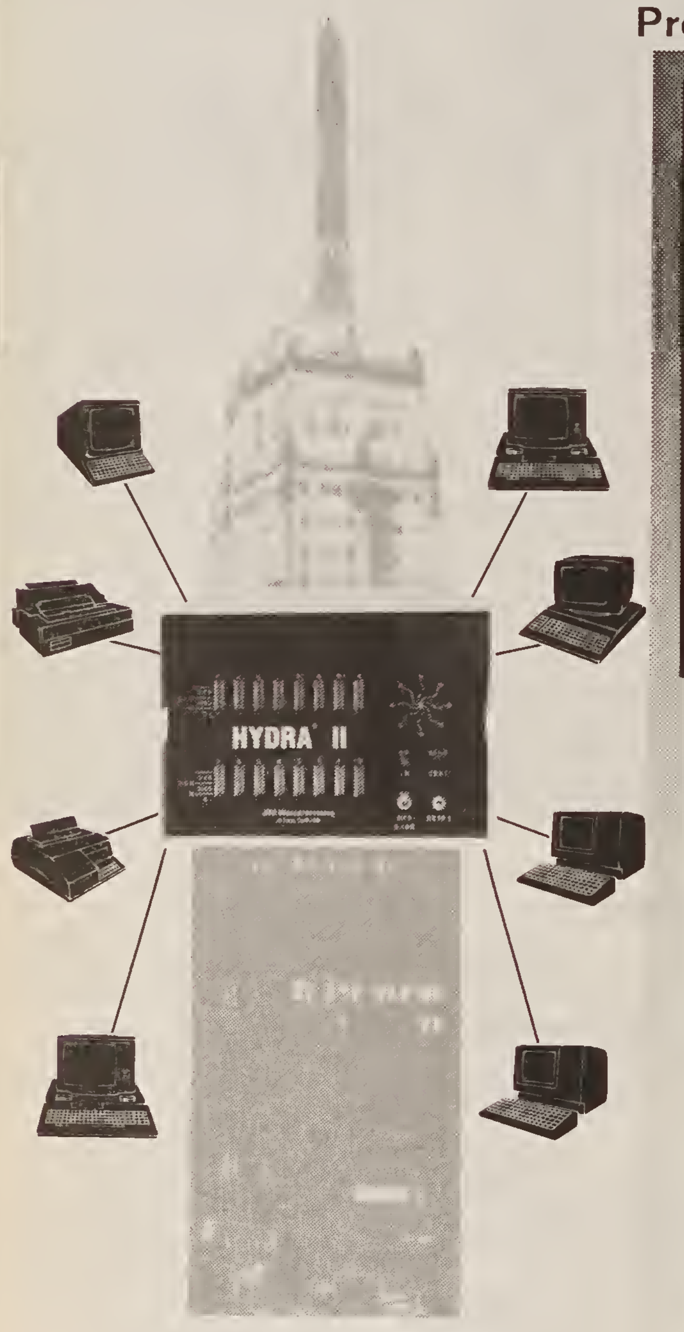

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HYDRA supports virtually any ASCII asynchronous RS-232 device including terminals, PCs, printers, bar code readers, document scanners, etc. You can direct connect or communicate from your office, home, or any remote location over voice-grade phone lines.

HYDRA provides 3270-type emulation for ASCII terminals and PCs, 1403/3211 system printer and 328X emulation for serial ASCII printers, and supports several PC to mainframe file transfer packages.

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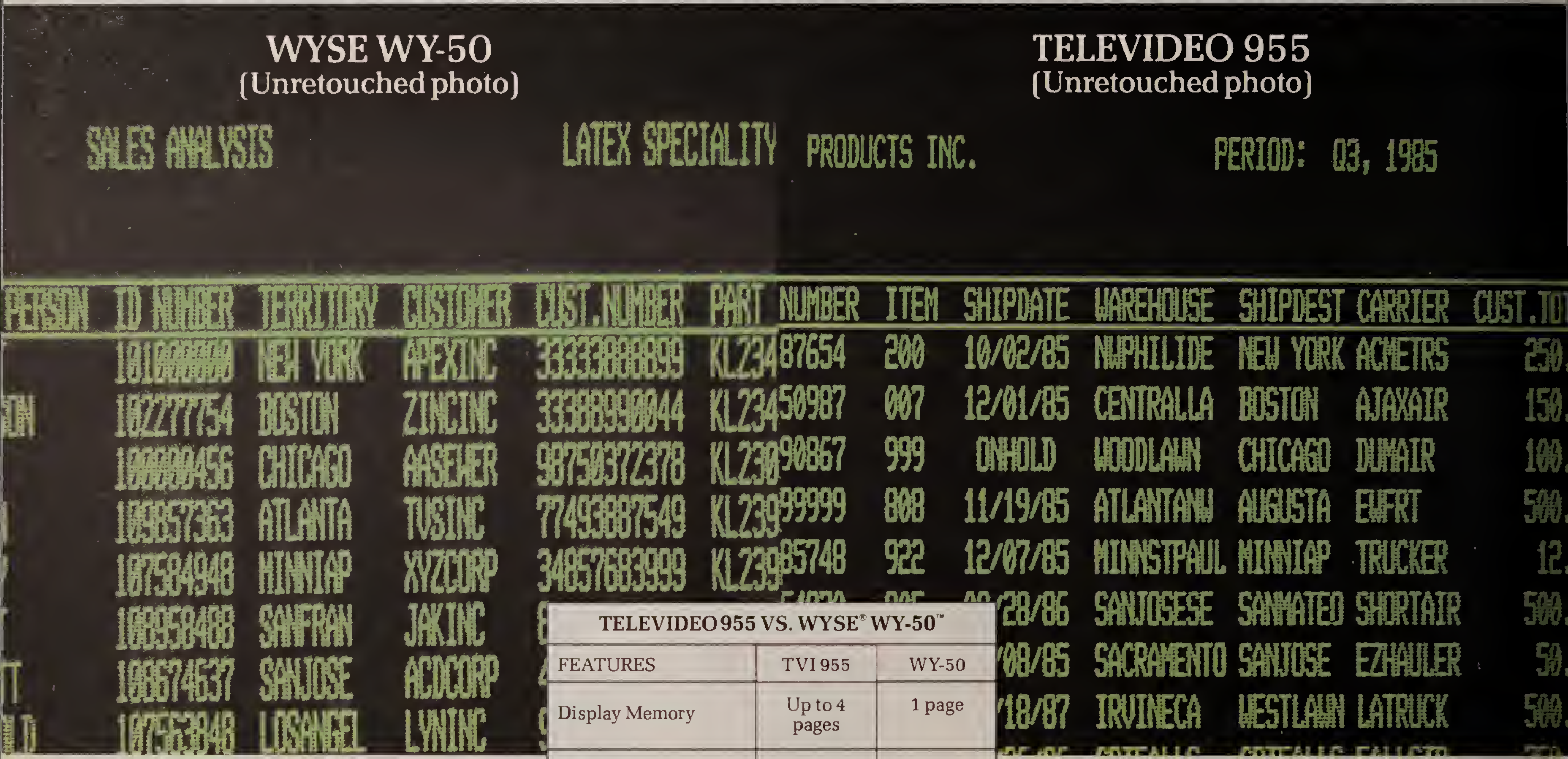
The TeleVideo 955. Seeing is believing.



WYSE WY-50
(Unretouched photo)

TELEVIDEO 955
(Unretouched photo)

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SALES ANALYSIS                LATEX SPECIALITY PRODUCTS INC.               PERIOD: 03, 1985

PERSON  ID NUMBER  TERRITORY  CUSTOMER  CUST.NUMBER  PART NUMBER  ITEM  SHIPDATE  WAREHOUSE   SHIPDEST  CARRIER   CUST.TO
        101000000  NEW YORK   APEXINC   33333888899  KL23487654   200   10/02/85  NWPHILIDE   NEW YORK  ACMETRS   250.
        102277754  BOSTON     ZINCINC   33388990044  KL23450987   007   12/01/85  CENTRALLA   BOSTON    AJAXAIR   150.
        100000456  CHICAGO    AASEWER   98750372378  KL23090867   999    ONHOLD   WOODLAWN    CHICAGO   DUMAIR    100.
        109857363  ATLANTA    TVSINC    77493887549  KL23999999   808   11/19/85  ATLANTANW   AUGUSTA   EWFRT     500.
        107584948  MINNIAP    XYZCORP   34857683999  KL23985748   922   12/07/85  MINNSTPAUL  MINNIAP   TRUCKER    12.
        108958488  SANFRAN    JAKINC                                      /28/86  SANJOSESE   SANMATED  SHORTAIR  500.
        108674637  SANJOSE    ACDCORP                                     /08/85  SACRAMENTO  SANJOSE   EZHAULER   50.
        107563848  LOSANGEL   LYNINC                                      /18/87  IRVINECA    WESTLAWN  LATRUCK   500.
```

TELEVIDEO 955 VS. WYSE® WY-50™

FEATURES	TVI 955	WY-50
Display Memory	Up to 4 pages	1 page
Programmable function keys	64	32
Dynamically allocated non-volatile function key memory	512	128
Maximum non-volatile bytes per function key	256	4
High contrast super dark Matsushita screen	Yes	No
List price	$499	$499

Sure, most $500 terminals can scrunch 132 columns onto a 14″ screen. But you need a magnifying glass to read them.

Not so with the TeleVideo® 955. We redesigned the proportion of our characters and put more space between them. And put them on a high contrast, super dark screen. The result is the most readable 132 column ASCII display available.

But there's more to the 955 than meets the eye.

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We put all this in a machine with an incredibly small 9″x12″ footprint. The result is a terminal that meets all the human factors standards recommended for adoption by the American National Standards Institute. All that, plus TeleVideo's full one-year end-user warranty.

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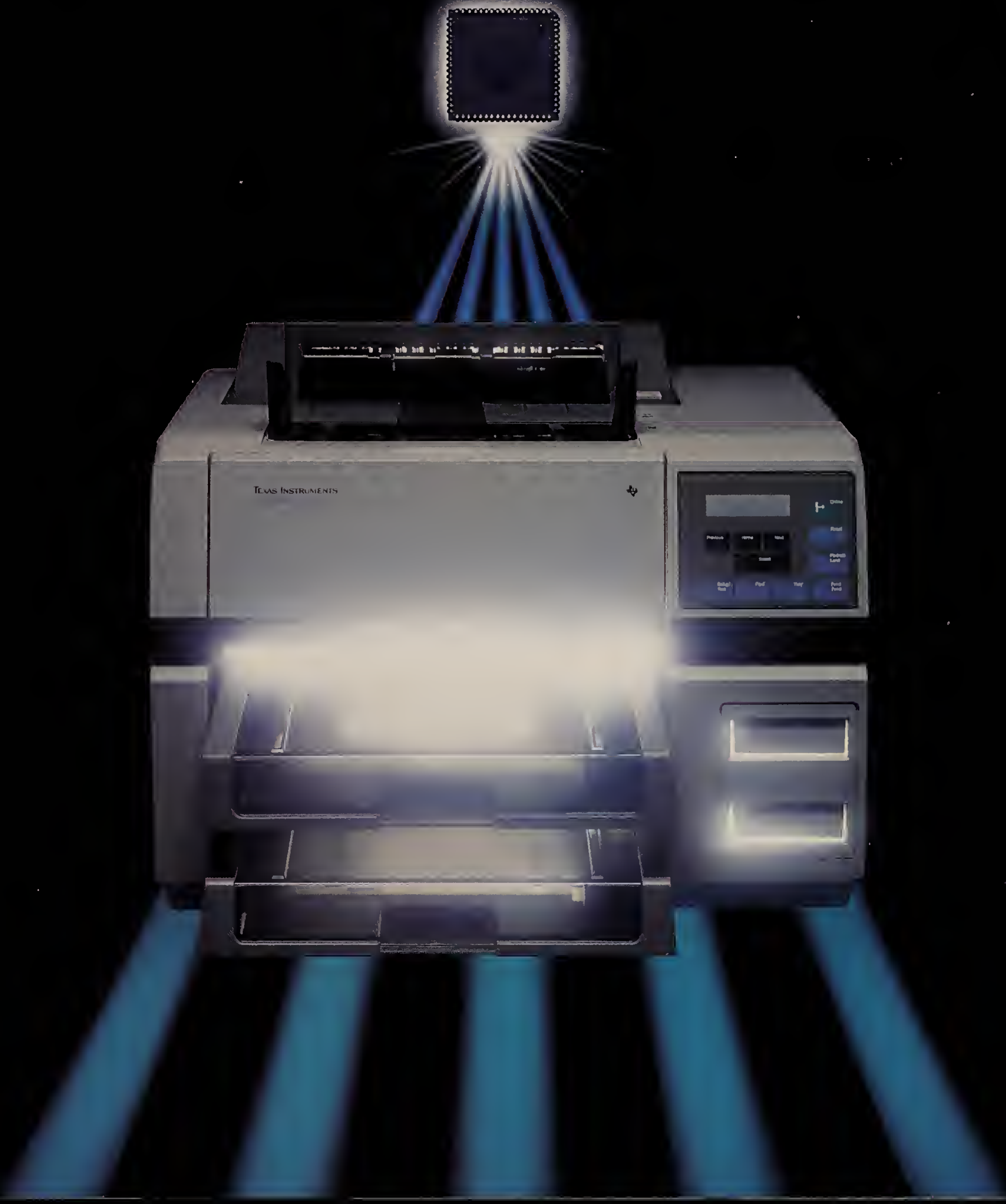
Texas Instruments technologies put the power of printers in a whole new light.



We've put TI technologies

Right now, there's a revolution going on in the office. Because with the speed, quality and affordability of the new generation of laser printers, applications like desktop publishing are changing the way businesses communicate forever.

The first family of second-generation laser printers.

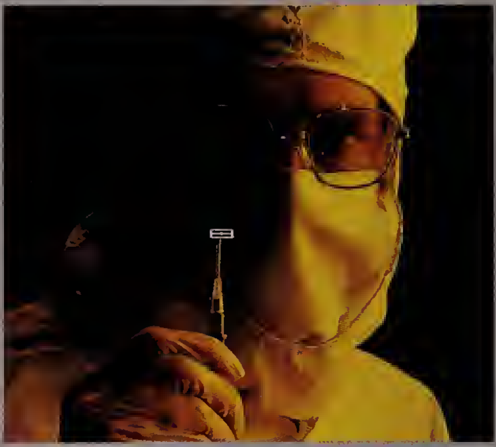
The first generation of laser printers represented a major step forward in printing capabilities. But that was just the beginning.

Thanks to advanced, second-generation print engines and proprietary TI controllers, we've created a family of laser printers that offers improved compatibility and up to 10 times the duty cycle, 15 times the machine life and five times the paper capacity of their first-generation counterparts.

For example, first-generation lasers were capable of handling 3,000 pages per month. But with TI OmniLaser™ Printers, you can produce as many as 25,000 pages a month, and at speeds of eight and 15 pages per minute.

It's what we put into OmniLaser Printers that makes their output so special.

OmniLaser Printers combine advanced electro-photographic technology with the latest semiconductor technology. Text and images are produced with outstanding resolution by addressing over 7.5 million dots on each page. But since each dot occupies a separate area of memory, it takes large-scale



TI's expertise in semiconductor technology allows us to create specialized components to provide laser printer users with increased ease-of-use, reliability and power.

to work on paper.

processing and memory power to manipulate, store and print these documents.

That's why our OmniLaser Printers perform so well. Because when it comes to semiconductor technology, TI wrote the book. Starting with our invention of the integrated circuit back in 1958, and continuing today with our Mega-Chip™ technologies that produce advanced semiconductor systems-on-a-chip, nobody has done more to increase the power, density and capability of the devices that are becoming the heart of laser printers.

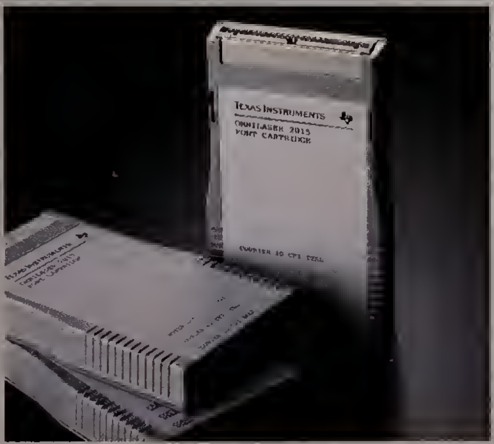
The intelligence inside an OmniLaser Printer is a case in point. It's a proprietary TI controller that's so powerful, it has more sheer processing capability than you'd find inside an IBM® PC AT™ computer.

We also made our OmniLaser Printers easier to operate. Because when you've been building printers as long as TI has, you develop an understanding of ergonomic factors. Like the convenience that comes from placing virtually all of the operator controls on an easily accessible front panel.

With PostScript®, the integration of text and graphics is anything but an afterthought.

PostScript, a standard in the desktop publishing industry, is a page description language that lets you control the placement, size and appearance of every element in your document. It's supported by both the OmniLaser 2108 and 2115 models, and with it you can produce cleaner, clearer, more professional output than was ever previously possible.

The OmniLaser Printer family also includes models that emulate the features of many printer standards, including HP LaserJet Plus, HPGL and IBM Pro Printer™, and since they're compatible with IBM, Apple® and others, there's an OmniLaser printer that's right for most applications.



These convenient plug-in cartridges provide for easy font selection, either manually or under software control.

The TI printer family includes laser printers, forms printers, personal printers and high-output models designed for shared-resource environments.

▶ *See back page for more information.*

The printers you need if your needs are demanding.

Our family also includes shared-resource serial-impact printers.

Most shared-resource environments are pretty tough on the hardware involved. So it follows that the more widely your resource is shared, the tougher it'll need to be. Which is one good reason to consider our OMNI 800™ family.

Our Model 810, for example, has become the standard for heavy-duty system printers. Over the years, they've proved themselves to be so durable, most of the world's largest airlines depend on them for ticket printing.

Then there's our Model 880s, which feature high-throughput, near-letter-quality printing and high-resolution raster graphics for data processing environments. And just about the only maintenance they require is the occasional ribbon change.

Increase operator productivity and eliminate forms waste.

The latest addition to our printer family is the Model 885 demand document printer. Just like the other family members, it's designed to be rugged and offer superior paper handling. But its differences make it ideal for applications where space is limited and paper waste is a consideration.

We've added a zero tear-off capability that eliminates forms waste. Simply put, it uses just one form where most printers would also use a second. It's front-loading, handles up to five-part forms with ease, and thanks to its small footprint, fits on a desk or countertop.

TI's 885 demand document printer includes a zero tear-off capability to eliminate forms waste.

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Our family of personal printers is well known for its sturdy qualities. We build them to offer industrial strength and design durability, coupled with convenient features like easily changeable font cartridges.

They feature dual-mode, letter-quality, color and graphics printing, and come in both 80- and 132-column models. And since they're compatible with most PC hardware and software on the market, they can help in virtually any application.

Durability and technology. A combination that's engineered to work for you.

As you can probably tell, there's a broad range of TI printers designed to fill most any need. And as different as they are in function, they have a couple of things in common: durable design and advanced technology.

Optional interface boards make TI printers compatible with IBM's 3270 protocol, or with System 34, 36 or 38 minicomputers.

At Texas Instruments, building printers that deliver these qualities isn't just a goal, it's a commitment. We call it putting TI technologies to work on paper. And all you need to do to put it to work for you is call us toll-free at **1-800-527-3500.** Call us soon. Because with your input, we can get to work on improving your output.

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TEXAS INSTRUMENTS

SYSTEMS & PERIPHERALS

HARD TALK

David Bright

DEC juggles, confuses

Earlier this month, Digital Equipment Corp. juggled its prices around a bit. It cut prices on some of its low-end systems and jacked up high-end prices to better reflect value. A similar juggling took place in March.

One end result of all this is that a high-end VAX 8000 series CPU now costs at least $100,000 more than it did just 5½ months ago. But DEC officials stress that customers should look at the whole picture. They point out, for example, that it has introduced denser and less expensive memory, added software to its list of discountable products and placed a one-year warranty on all its products. According to Marc Roberts, corporate product operations manager, the total cost of ownership for the high-end VAX 8000 series systems is now less than it was before, despite the basic price increase.

Roberts suggests that customers bothered by the notion of paying more for the same systems, and therefore messing up their carefully planned budgets, simply haven't figured everything in.

That may very well be true, but perhaps it might have been better, marketingwise, if DEC had left system prices alone and instead looked for other ways of reducing the total cost of ownership. Let's face it, it can sometimes be difficult to make people think they are getting a good deal when prices go up but performance doesn't.

In the past, surely DEC and other computer vendors have raised system prices like this, but no particular instance comes readily to mind. "I'm sure we've made price increases in the past, although I can't remember when," Roberts says.

Overall, Roberts says, DEC customers are quite happy with the changes. "The general response has been very positive," he notes. In a DEC survey of the company's 100 largest accounts, "People were generally

Continued on page 46

Beacon brightens Boston stocks

Single system installation ups trade processing, volume, contains costs

BY STANLEY GIBSON
CW STAFF

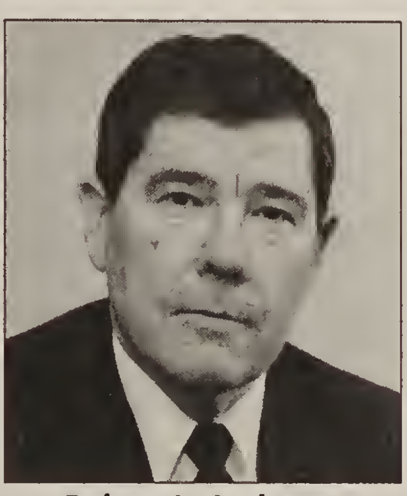
BOSTON — For more than 150 years a quiet regional exchange in the shadows of the trading world, the Boston Stock Exchange is gaining its share of the spotlight by installing the Beacon computerized trading system.

The $2 million Beacon system is a stock trading and communications application designed to run on three Stratus Computer, Inc. fault-tolerant minicomputers working in conjunction with about 100 Zenith Data Systems personal computers. Although the exchange switched to the new system in July, some fine tuning is still being done.

"Beacon is the first attempt to put all the capabilities on one system at one time," says Robert L. Andrews, data processing manager of the exchange. In addition to providing traders with current stock prices, the system automatically executes trades at the lowest possible price for buyers and at a low cost per transaction to the exchange.

Single system unique

Andrews says other regional exchanges have systems that perform the same tasks Boston's does, but those systems are collections of separate hardware and software applications, not a single system installed at one time. Although Andrews stops short of claiming that Beacon puts Boston far ahead of other regional systems, he says it is a safe bet that Boston will no longer be technologically behind.



Robert L. Andrews

Andrews, who came to the Boston Stock Exchange in February to take over implementation of the Beacon system, brought with him 15 years of experience in the securities industry, having helped develop the National Association of Securities Dealers' Automated Quotation system.

The Boston exchange is one of five regional exchanges; the others are located in Chicago, Los Angeles, Philadelphia and Cincinnati. Founded in 1834, the Boston Stock Exchange has operated almost continuously ever since, the exception being several months at the beginning of World War I.

With 200 members, the exchange trades only equity securities, including stock, preferred stock, warrants and bonds. It does not deal in over-the-counter stocks, commodities futures or options.

Technology has played a key role in turning the tide of the exchange's fortunes since 1981, when it lost more than $1 million. Inadequate systems meant Boston could not process trades fast enough to achieve economies of scale. The exchange had to recover overhead expenses by charging more per trade than other trading centers. In 1982, the exchange asked its members for a financial commitment to upgrade its computer system.

Members responded to the appeal by putting up $750,000 in working capital, which has since been paid back, according to James Crofwell, senior vice-president and treasurer of the exchange. "It was time to put up or shut up, and we got help, not just from regional members but from the Boston offices of national firms," Crofwell recounts.

Cutting costs

Some of the money was spent on an IBM 4381, which has helped the exchange cut costs and contributed to three rate cuts since 1985. These rate cuts have dropped the price of a trade by 50%. The Beacon system is aimed at further accelerating trading, boosting trade volumes and keeping costs down.

The system executes trades automatically by scanning all U.S. exchanges and locking in the best bid available, using the the Intermarket Trading System, a computer securities trading network of which the Boston exchange is a member. The system is operated by the Securities Industry Automation Corp.

After an order is entered by a broker, it goes to a trader on the floor who may execute the order or delay in hope of a better price.

Continued on page 46

Raster adds to graphics capability

Announces collaboration with Sun to ensure hardware portability

WESTFORD, Mass. — Raster Technologies, Inc. recently introduced a graphics processor designed for high-performance two- and three-dimensional applications.

In announcing the Model One/385, the company also introduced the first two members of its family of GX4000 3-D graphics accelerators, which were designed for use with Sun Microsystems, Inc. workstations.

The Model One/385 reportedly features a proprietary IEEE floating-point processor architecture that is optimized for 2-D and 3-D graphics algorithms.

The company claimed that the system processes up to 140,000 3-D vector/sec. It was designed to provide a resolution of 1,280 by 1,024 pixels, support for eight local light sources and up to 16.7 million colors. It also features a built-in direct-memory access interface for connections to a range of processors, Raster said.

The system was designed to allow flexibility and upgradability with configurable features, including up to 12M bytes of local display list memory, 8 to 24 bits of image memory, double buffering, support for multiple independent displays and 8-bit image overlays. Prices start at $33,000; shipments are scheduled for the fourth quarter.

Raster also announced a collaborative agreement with Sun, under which the companies will work to ensure graphics software portability between the Sun-3 and Sun-4 workstation families and Raster's GX4000 series.

The GX4000 series was designed to speed execution of proposed ANSI Programmer's Hierarchical Interactive Graphics Standard (PHIGS) and PHIGS+. A configuration that includes 8M bytes of display list memory costs $38,995.

Surge seen for optical disk drives

BY DAVID BRIGHT
CW STAFF

MOUNTAIN VIEW, Calif. — Optical disk drives will see much greater acceptance within the next three years as their use expands to broad business applications, a recently released report predicts. In addition, a significant portion of those drives will be erasable units.

By 1990, worldwide revenue from optical disk drives will exceed $1.4 billion, up sharply from $203 million in 1986, according to the report from Disk/Trend, Inc., a market research firm based here.

Optical disk drives are currently broken down into two categories: read-only types (mostly in a compact disk/read-only memory format) and those that can be written on once.

So far, the major applications for the write-once drives have been in image storage, for which the drives' performance limitations are not a serious drawback. Those applications include law enforcement, military systems and medical information storage. As various system development programs now under way reach completion, the drives will also be used for broader based business applications, the report says.

Shipments of optical disk drives reached only 31,700 units in 1986, according to Disk/Trend. But the research firm says shipments should triple this year and nearly triple again in 1988, finally topping one million in 1990. In 1990, shipments of read/write drives of less than 1G-byte capacity will reach some 619,800 units, surpassing read-only devices as the most popular type of optical drive, the report predicts.

Erasable optical disk drives should soon be making a big impact, Disk/Trend reports. The

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Inside

- Strobe Data development allows DG software to run on IBM PCs. Page 46.
- Vicom Systems designs peripheral processor for Sun-3 workstations. Page 50.
- Printer Systems converters communicate with IBM machines. Page 51.

Falcon executes DG software on PCs

BELLEVUE, Wash. — Strobe Data, Inc. recently introduced a coprocessor card and software package for the IBM Personal Computer XT and PC AT that reportedly enables those machines to execute software written for Data General Corp. Nova minicomputers.

The Falcon coprocessor can execute DG's RDOS and other software written for the Nova computers without any reprogramming or special software, according to Strobe.

The Falcon coprocessor becomes the main processor, while the PC processor serves as a peripherals controller in such a system, according to Ellen Oliver, Strobe's director of marketing.

Sold to developers

Oliver said Strobe is selling the system primarily to developers, who will resell it in a package with their Nova applications software and an XT, AT or a clone.

The Falcon can also emulate 16-bit DG Eclipse instructions, she said.

However, she added that some customers have been using the Falcon card primarily to make an XT or AT into a multiuser system. This can be done by using the PC's serial ports or by attaching a multiplexer, she explained.

Currently available, the Falcon coprocessor carries a suggested retail price of $3,975.

Quantity discounts for the product are available, Strobe said.

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Beacon

FROM PAGE 45

If the trader does not act to delay within 15 seconds, the trade is automatically completed. Such instant execution keeps traders from having to perform many trades for relatively small orders and frees them to spend more time personally handling large orders. The overall effect is to speed up traders, enabling the exchange to handle more trades. As time goes on, that will mean more fees and the greater prestige that goes with handling large trade volumes.

Although it is a total system, Beacon is composed of two parts. One Stratus XA600 processor handles communications with exchanges to gain current stock quotations — the so-called ticker plant function — while the XA2000s process the trades and perform workstation functions for the PCs used by the members on the floor.

In turn, each user has two screens, one containing stock price information and the other carrying on the intelligent functions of the PC, including historical information on the stock.

Members needed some training to work with the PC, having worked before only with Quotron Systems, Inc. terminals, which have different keyboards than PCs. "You have to be comfortable before you can do any trading," Andrews explains.

Beacon does not displace the exchange's 4381, however, which is used at night to store information taken from the on-line Stratus machines. Data stored in the 4381 is sent to the National Securities Clearing Corp. and is also used in monthly statements. And in a stage following Beacon's development, member firms will be able to connect their remote systems to the 4381.

Beacon's software was designed by Femcon Associates, Inc., a Westford, Mass.-based firm that specializes in financial services applications written for Stratus computers. "We see Stratus as being a good on-line transaction processor, and it has good networking," says Craig Conti, a Femcon cofounder and executive vice-president.

Conti says Femcon is hoping for wide marketing of Beacon on the advent of 24-hour trading. "Other exchanges believe they have to tie in and become part of the global, 24-hour trading network in order to survive," he says. European exchanges similar in size to Boston's have expressed interest in a Beacon-type system, he adds.

Founded in 1980, Femcon's major creation is Continuous On-Line Trading System (Colt). Colt tracks user trading positions in given securities and tracks their profits and losses. The Beacon package includes Colt features.

The ticker plant component of the system is based on a software package called Market Access, created by Market Systems Technology, Inc. in Boston, which is partially owned by CMQ Communications, Inc. in Toronto.

"Market Access has custom-written interfaces for a variety of securities exchanges. Some exchanges may have different protocols. For example, some use bisynchronous protocols; others use asynchronous," Market Systems' Stan Jackson says. After receiving the data from the different sources, Market Access puts the information on a single data stream, Jackson explains.

Now handling the some two million shares per day that change hands at the Boston Stock Exchange, Beacon is just beginning to show its value. "The floor really likes it," Andrews says.

Optical

FROM PAGE 45

first significant shipments of erasable drives will begin in 1988, and by 1990 the drives will account for 68% of all read/write optical disk drives sold worldwide with less then 1G-byte capacity, Disk/Trend said. Image-storage applications will generally use 5¼-in. erasable optical drives, and personal computers will begin using 3½-in. versions of the drives, the report notes. Both sizes are expected to replace tape drives as the preferred backup device.

The number of vendors making optical disk drives is also expected to grow from 21 in 1986 to 28 by the end of this year. Although nearly half of the 1986 sales took place in the U.S., non-U.S. manufacturers accounted for 92% of those sales, according to the report.

DEC

FROM PAGE 45

pleased with the much better memory and the ability to expand the machines. No other issues really came up."

Meanwhile, the Microvax III, said to use a CMOS-based microprocessor to at least double the Microvax II's 0.9 million instructions per second (MIPS) performance, is expected to be a main attraction at Decworld. "It's the worst-kept secret in the world," laughs one DEC user.

Many performance-hungry DEC customers would like to see DEC introduce a new high-end system. "Our problems have outgrown VAXs," one scientist says. "If I want 40 MIPS, I'll have to buy from someone else."

Bright is a *Computerworld* senior writer.

Announcing the biggest merger in the computer business.

The merg computer in

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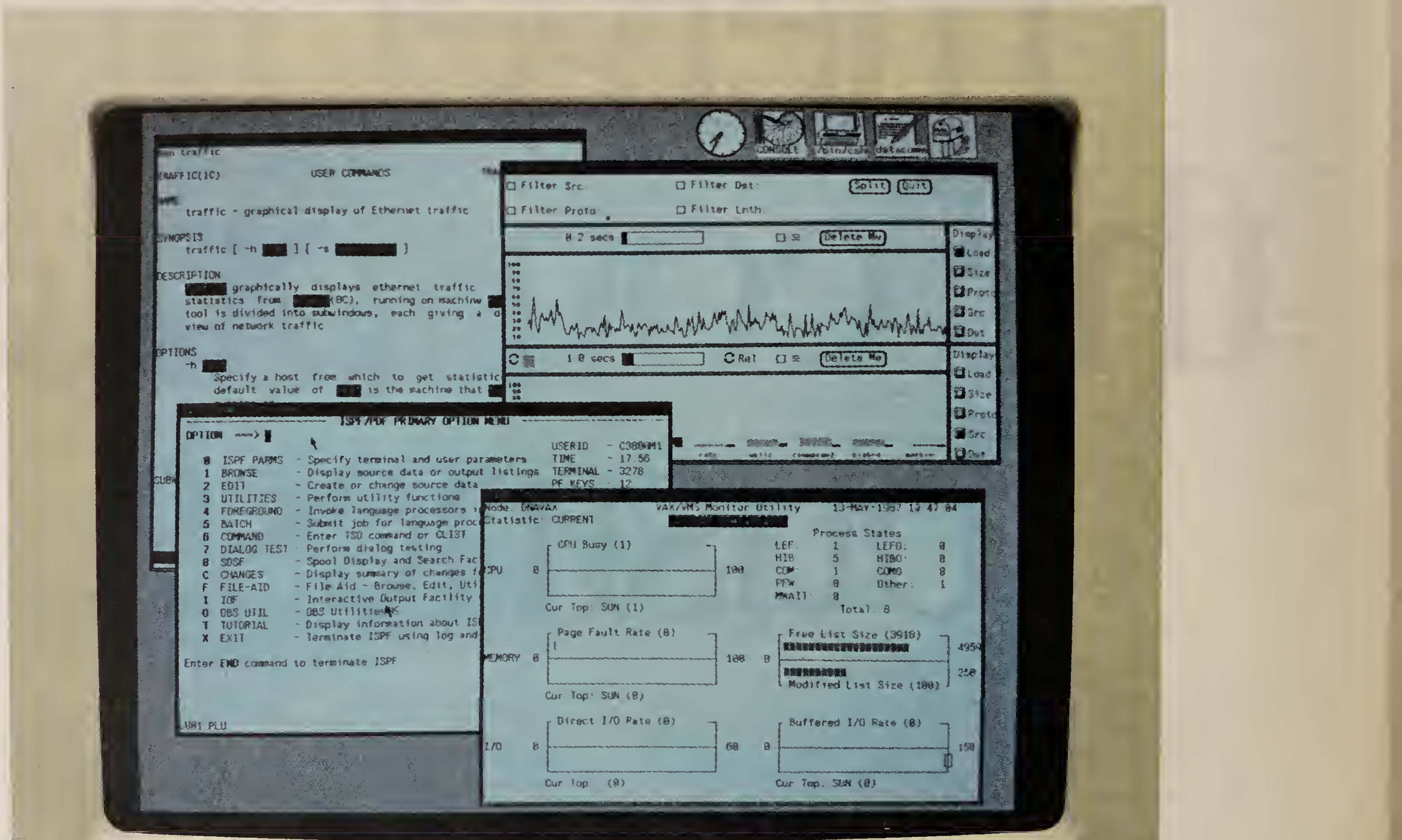

```
n traffic
RAFFIC(1C)              USER COMMANDS
traffic - graphical display of Ethernet traffic
SYNOPSIS
    traffic [ -h [illegible] ] [ -s [illegible] ]
DESCRIPTION
    [illegible] graphically displays ethernet traffic
    statistics from [illegible](8C), running on machine
    tool is divided into subwindows, each giving a d
    view of network traffic
OPTIONS
    -h [illegible]
        Specify a host from which to get statistic
        default value of [illegible] is the machine that
```

```
☐ Filter Src.            ☐ Filter Dst.        (Split) (Quit)
☐ Filter Proto.          ☐ Filter Lnth.
      0 2 secs              ☐ ≅   (Delete Me)      Display
                                                   Load
                                                   Size
                                                   Proto
                                                   Src
                                                   Dst
      1 0 secs        Rel   ☐ ≅   (Delete Me)      Display
                                                   Load
                                                   Size
                                                   Proto
                                                   Src
                                                   Dst
```

```
---------------------- ISPF/PDF PRIMARY OPTION MENU ----------------------
OPTION ===>
                                                       USERID   - C380#M1
  0 ISPF PARMS  - Specify terminal and user parameters  TIME     - 17.56
  1 BROWSE      - Display source data or output listings TERMINAL - 3278
  2 EDIT        - Create or change source data          PF KEYS  - 12
  3 UTILITIES   - Perform utility functions
  4 FOREGROUND  - Invoke language processors i
  5 BATCH       - Submit job for language proc
  6 COMMAND     - Enter TSO command or CLIST
  7 DIALOG TEST - Perform dialog testing
  8 SDSF        - Spool Display and Search Fac
  C CHANGES     - Display summary of changes f
  F FILE-AID    - File Aid - Browse, Edit, Uti
  I IOF         - Interactive Output Facility
  0 DBS UTIL    - DBS Utilities
  T TUTORIAL    - Display information about IS
  X EXIT        - Terminate ISPF using log and

Enter END command to terminate ISPF

UN1 PLU
```

```
Node. [illegible]           VAX/VMS Monitor Utility     13-MAY-1987 13 47 04
Statistic  CURRENT
                                                 Process States
         CPU Busy (1)                        LEF.    1     LEFO:    0
CPU    0                            100      HIB     5     HIBO:    0
                                             COM     1     COMO     0
                                             PFW     0     Other:   1
         Cur Top: SUN (1)                    MWAIT   0
                                                      Total. 8
         Page Fault Rate (0)                   Free List Size (3918)
MEMORY 0                            100    0                            4952
                                                                         250
                                               Modified List Size (100)
         Cur Top: SUN (0)
         Direct I/O Rate (0)                   Buffered I/O Rate (0)
I/O    0                             60    0                             150
         Cur Top  (0)                          Cur Top. SUN (0)
```

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er of every
your business.

As you may have guessed, though, this is no ordinary screen.

It belongs to the most powerful Sun workstation ever built.

Our new Sun-4/260, the first born of our brand new family of supercomputing workstations and servers.

In computer-ese, it delivers the performance of 10 MIPS.

For the sake of comparison, that's as much horsepower as a minicomputer like the DEC VAX 8800.

At a tenth the cost.

Since there are those of you who are interested in such things, the reasons for this leap in price/performance include a host of technological advancements, such as a full 32-bit RISC-based architecture and 128 Mbytes of main memory.

Best of all, it's available now—along with an astonishing amount of third-party software support.

But we don't want to give the impression our new Sun-4 series is the only reason we can do what we do.

Merely the latest.

Software support for the Sun-4/260.
Living proof it's no empty box.

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- *Analysis/Design*
- *Animation*
- *Auto Test Generation*
- *Bio Engineering*
- *Computational Chemistry*
- *Design/Drafting*
- *Doc. Config. Mgmt.*
- *Earth Resources*
- *ECAD*
- *Electronic Publishing*
- *Engineering Graphics*
- *Expert Systems*
- *FEA*
- *Financial*
- *Fluid Dynamics*
- *Graphics*
- *Imaging*
- *Layout Verification*
- *Logic/Fault Simulation*
- *Machining*
- *Math & Stat*
- *MCAD*
- *Molecular Modeling*
- *Numerical Control*
- *Schematic Capture*
- *Seismic Processing*
- *Silicon Compilation*
- *Simulation/Test*
- *Software Development Environment*
- *Solids Modeling*
- *Structural Analysis*
- *Styling & Appearance Modeling*

WE TAKE CARE OF OUR OWN.

The introduction of Sun-4 in no way means we're abandoning our Sun-2 and -3 customers.

On the contrary.

They're very much a part of our grand Open Systems Network design for the future of computing.

Sun-2 and -3 applications are easily portable to Sun-4's and vice versa.

All three can coexist on the same network.

And Sun-3's can even be upgraded to Sun-4's with a simple board swap.

What Sun-4 gives us is the broadest line of workstations in the world.

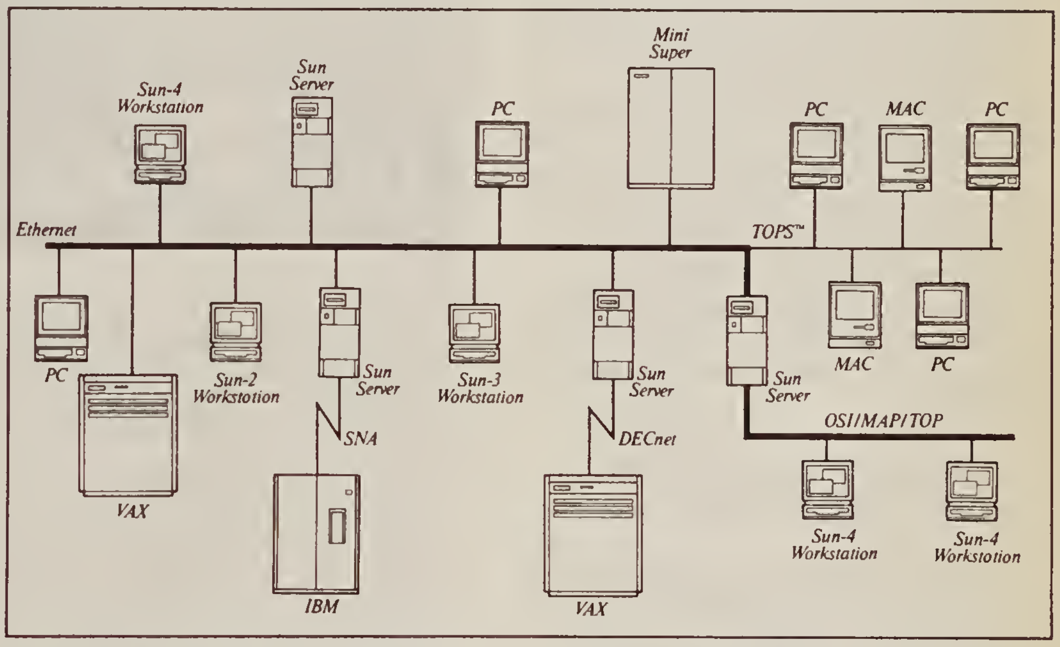
What it gives you is a compatible growth path to the most cost-effective and powerful workstations in the world.

And a way to get everyone in your company who should be working together, working together.

YOU'LL HAVE CONNECTIONS TO EVERYBODY IN THE BUSINESS.

Only Sun has all the pieces of the Open Systems Network in place.

Including an open architecture based on standards. Advanced network services. Across-the-board licensing of innovations and implementations.



With Sun's Network File System (NFS™) and SunLink, everyone can access all the computer resources in the company, across different operating systems, different software, even different networks, from PC's to mainframes. It's as though your company has just one computer. One computer with the power of many. And the network is that computer.

Broad-based hardware/software industry support. And a long list of network management services for vendors and customers alike.

Our strategy is paying off.

Together with the advances we've made in price/performance, it allows us to build a network with the capability to include the greatest number of diverse computer systems at the lowest cost.

In other words, a network that works. For everyone.

If you'd like to know more about how we can get all your computers together with our new supercomputing workstation, call 800-821-4643, in California, 800-821-4642. Or write Sun Microsystems, 2550 Garcia Ave., Mountain View, CA 94043.

It's one merger that promises to be good for everybody.

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NEW PRODUCTS

Processors

A modular deskside image processing workstation designed as a peripheral processor to a Sun Microsystems, Inc. Sun-3 workstation has been announced by **Vicom Systems, Inc.**

The **Vicom-VME** utilizes a 32-bit parallel data bus, a 32-bit address bus and a control bus. The bus structure allows image memories, dedicated processors and the Sun-3 to be interconnected. Separate modules for image acquisition, processing and display are offered.

Image processing algorithms are executed by sequence of point, ensemble and spatial operations. The implementation of Unix 4.2 Sun OS as the operating system provides the user with high-level languages for algorithm development and customized processor control.

The Vicom-VME costs $48,000.

Vicom Systems, 2520 Junction Ave., San Jose, Calif. 95134.

A universal small computer systems interface (SCSI) host adapter board called the **VME-SCSI/U** has been introduced by **Integrated Solutions, Inc.**

The board is said to support any SCSI target device that conforms to ANSI X3.121 and complies with the Common Command Set. It occupies one slot on the VME backplane and provides a maximum data transfer rate of 1.5M byte/sec.

The Universal SCSI includes a 16-bit processor, an on-board 16K-byte data buffer memory and power-on self-test diagnostics.

The VME-SCSI/U costs $1,795.

Integrated Solutions, 1140 Ringwood Court, San Jose, Calif. 95131.

A 2M- to 16M-byte add-in memory board for use in Data General Corp.'s MV4000, MV10000 and Eclipse 5280 processors has been introduced by **System Controllers & Interface Products**.

Described as a plug-and-play emulator of DG's Universal Memory, the **MV410** is availble in 2M-, 4M-, 8M- and 16M-byte sizes with the starting memory address-selectable in 1M-byte boundaries via a five-position board-edge switch.

Other features include a board-deselect switch that removes the memory from the system and two LEDs on the board edge that indicate memory power on and memory selected.

The MV410 is priced from $3,000 for 2M bytes to $15,900 for the 16M-byte board.

System Controllers & Interface Products, 449 S. Beverly Drive, Beverly Hills, Calif. 90212.

Data storage

A magnetic tape subsystem designed to interface to Data General Corp.'s Nova, Eclipse and MV processors, has been introduced by **Zetaco, Inc.**

The **Model Zip-12** subsystem employs a cartridge tape drive that holds 630M bytes of data when formatted under DG 4307 software parameters. It is said to back up about 10M bytes of data per minute using standard DG backup utilities, and it can be preset to do backup without operator intervention.

The Model Zip-12 runs under DG's AOS/VS operating system, emulating a 4307 tape subsystem. It interfaces to the computer via DG's Burst Multiplexer Channel and uses a 24-track serpentine recording format with a recording density of 16,000 bit/in. The average data transfer rate is 250K byte/sec.

The Zip-12 costs $15,395.

Zetaco, 6850 Shady Oak Road, Eden Prairie, Minn. 55344.

Two bubble-memory cassette systems with 0.5M-byte Bubbl-Pac cartridges, said to be direct replacements for standard 5¼-in. floppy disk drives, have been announced by the **Bubbl-Tec** division of PC/M, Inc.

The **BDJ-1 Bubbl-Dek** system fits the same mounting holes as a standard full-height 5¼-in. floppy disk drive, the vendor said. It provides two front-panel slots for Bubbl-Pac plug-in cartridges. The **BDJ-2** is a half-height unit that accommodates a single Bubbl-Pac.

All controllers for the Bubbl-Deks provide automatic error detection and correction and automatic retries for software errors. They also provide built-in self-test capabilities.

The BDJ-2 costs $787. The BDJ-1 costs $1,291.

Bubbl-Tec, 6805 Sierra Court, Dublin, Calif. 94568.

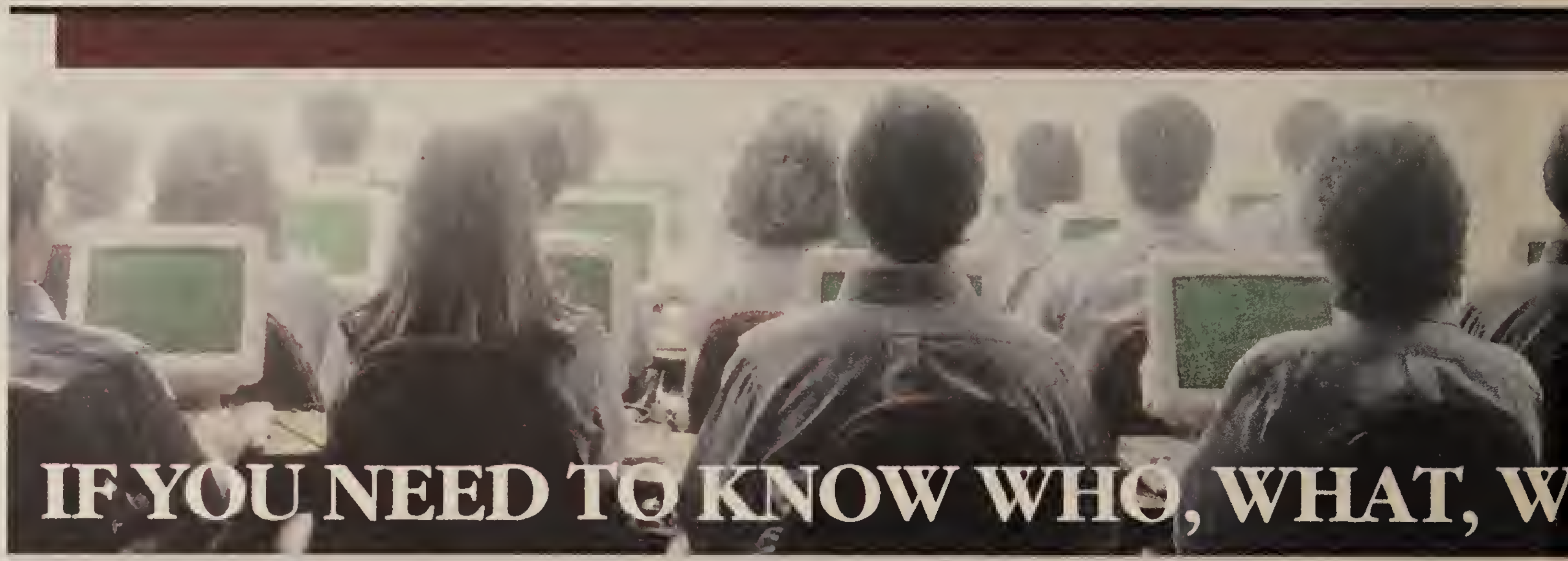
Two disk drive controllers designed for Digital Equipment Corp. Microvax, MicroPDP-11 and LSI-11 computers have been introduced by **Distributed Logic Corp.**

The **DQ246** controller can interface up to four storage module drive-type disk drives. The companion **DQ256** can interface up to four SMD enhanced-class drives.

Both products can reportedly optimally fragment a record across multiple platters and offer multipattern formatting capabilities. Each has a command-queue buffer capable of storing up to 21 seek commands.

The DQ246 costs $2,250. The DQ256 costs $2,850.

Distributed Logic, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.



IF YOU NEED TO KNOW WHO, WHAT, W

BASIS®
Text Information Management System

BASIS was the first software system developed specifically for the storage and retrieval of large volumes of textual information. Today, with over 800 installations worldwide, BASIS remains the ultimate Text Information Management System (TIMS) available. Anywhere.

Design flexibility makes BASIS software the ideal TIMS for diverse information management needs.

From the boardroom, to the newsroom, BASIS' modular design offers flexibility in tailoring the application to the need. Which is why BASIS has helped automate corporate and technical libraries, research and development projects, law offices, government departments and agencies, financial and insurance companies, publishing concerns, educational institutions, manufacturing companies, and primary resource industries.

In fact, there really isn't much BASIS can't do when it comes to text information management. BASIS' system provides fast, efficient access to textual *and* numeric data in its databases for accurate and timely reporting.

BASIS ENABLES TEXT AND DATA RETRIEVAL FROM A GROWING WORLD OF INFORMATION. SIMPLY. QUICKLY. EFFICIENTLY.

BASIS is designed to keep pace with your world of information, and, without the constraint of hardware dependence.

Because BASIS is portable, your applications can run on many computers, minimizing your hardware dependency as applications increase in size…an important consideration when you are evaluating software for your text information management needs.

As sophisticated as BASIS may seem, it remains a system that is simple to use.

Fast, efficient information retrieval is possible in even the largest databases. BASIS uses "fast path" indexing techniques, providing a simple, yet powerful query facility that makes complex searching easy. Novice and casual users may retrieve information and generate reports using menus and simplified command statements. Advanced users may compose freeform query statements and generate ad hoc reports using the English-like query and data manipulation language. BASIS' help facility operates at three levels of expertise—beginner, advanced and expert so you always have immediate access to assistance.

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Terminals

A Digital Equipment Corp.-compatible terminal that can be connected to two hosts for simultaneous operation has been announced by **CIE Terminals, Inc.** a subsidiary of C. Itoh Electronics, Inc.

The **CIT310** provides instant on-line switching between hosts. In dual-session mode, the screen can be split horizontally. Each host can have an independent screen display of 24 rows.

Other features include 1K byte of nonvolatile function memory per session, allowing 180 programmable functions accessible through 45 function keys, and separate set-up menus for each session.

The CIT310 costs $749.

CIE Terminals, 2505 McCabe Way, Irvine, Calif. 92714.

A point-of-sale (POS) terminal called **Datalink II** has been announced by **MSD Systems, Inc.**

The terminal was desined to interface with computer systems running POS applications software. The terminal contains a standard electronic cash register keyboard, a receipt printer, a CRT and support for up to four cash drawers.

The Datalink II can also function as a simple stand-alone cash register if the host computer becomes inoperable. In stand-alone mode taxes are automatically calculated, 10 departments are supported, there are five tenders and report-printing data is captured.

Datalink II features four RS-232 serial ports that operate at 150 to 19.2K bit/sec. The terminal costs $2,695.

MSD Systems, Suite 206, 10031 Monroe Drive, Dallas, Texas 75229.

Printers/Plotters

A printer said to combine bar code, labeling and demand document printing capabilities has been announced by **Facit, Inc.**

Called the **Documate 3000**, the 200 char./sec., 80-col. matrix printer can print 11 bar code combinations, any type of label and forms consisting of up to six parts.

Fonts are contained on a plug-in font card and can also be down-line loaded.

The Documate 3000 is priced at $1,495.

Facit, 9 Executive Drive, Merrimack, N.H. 03054.

A printing system designed for use with the IBM System/34, 36 and 38 and featuring a 20 page/min. laser printer with duplex capability has been announced by **General Business Technoloy, Inc.**

The **6637PM** printing station offers a print resolution of 300 by 300 dot/in. It features dual 250-sheet input trays that accept 8½- by 11-in. paper.

The user can select from 34 resident fonts.

The display station, called Model 7710DS, features a 14-in. display in green or amber and a 122-key keyboard with 24 command keys, according to the vendor.

The 6637PM is priced at $27,670.

General Business Technoloy, 1891 McGraw Ave., Irvine, Calif. 92714.

Printer Systems Corp. has introduced the **Printmate Coax** and **Printmate Twinax**, protocol converters designed to provide communication with IBM computers.

The converters feature cartridges that contain upgradable emulation software specific to individual printers.

The Printmate Coax emulates the IBM 3287-2 and 4214-1 dot matrix printers and the IBM 3262-3/13 line printer.

The Printmate Twinax enables communication with IBM minicomputers.

The Printmates cost $1,495 each.

Printer Systems, Suite 100, 1485 Chain Bridge Road, McLean, Va. 22101.

Input devices

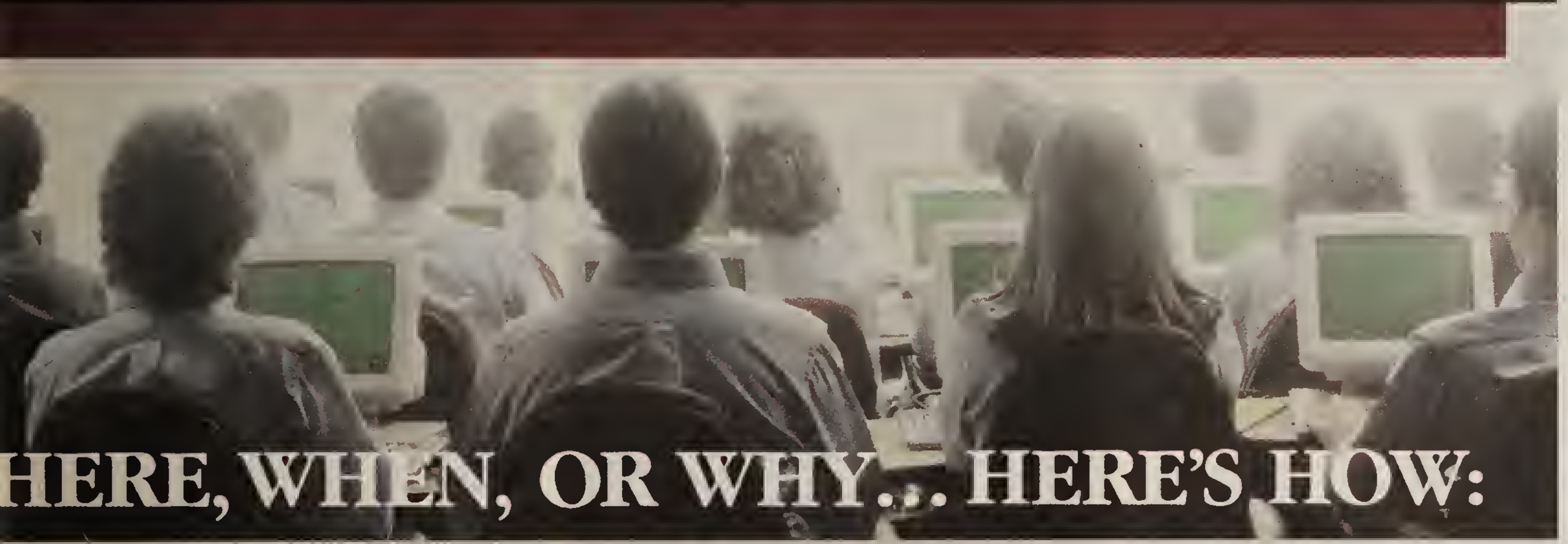
An optical character-recognition page scanner designed to process various page formats, including documents with both text and graphics, has been announced by **Recognition Equipment, Inc.**

The **Tartan XP90** system, which includes a Tartan XP90 scanner and an REI IBM Personal Computer AT-type system, processes print or type in most font sizes, styles and formats. It captures a bit-mapped image of the document at a rate of 100 char./sec. and converts text to ASCII characters at a resolution of 300 dot/in.

Users can define up to 256 data-capture zones per form, alpha and/or numeric zones, English or structural context and fixed or variable pitch. Also included is a 70,000-word dictionary. Density can be selected, and a document can be rotated.

The Tartan XP90 system is priced from $80,000.

Recognition Equipment, P.O. Box 660204, Dallas, Texas 75266.



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BASIS systems are easily implemented, becoming quickly productive. And, that makes sense.

One of the best benefits of selecting BASIS for your TIMS is the ease with which BASIS can be implemented and tailored to your existing applications environment. And, as many MIS/DP managers have discovered, BASIS even provides applications opportunities for end users, thanks to BASIS' fully integrated applications development facilities. Once implemented, BASIS databases are easily modified without disrupting systems operations. New files and record fields may be added or changed without reloading data.

BASIS is accurate, efficient, and secure.

Password protection and privilege code access secure BASIS installations at the database, index, record and field levels, to satisfy the most particular confidentiality requirements of your databases.

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BASIS and DM are both products from the minds of Information Dimensions, Inc., a subsidiary of Battelle—since 1929, the preeminent independent research facility in the world.

This proud heritage is your assurance the BASIS and DM systems are truly representative of the most innovative development in software technologies available for TIMS and DBMS applications. And, Information Dimensions provides a network of marketing, technical services and systems support, with offices and personnel worldwide.

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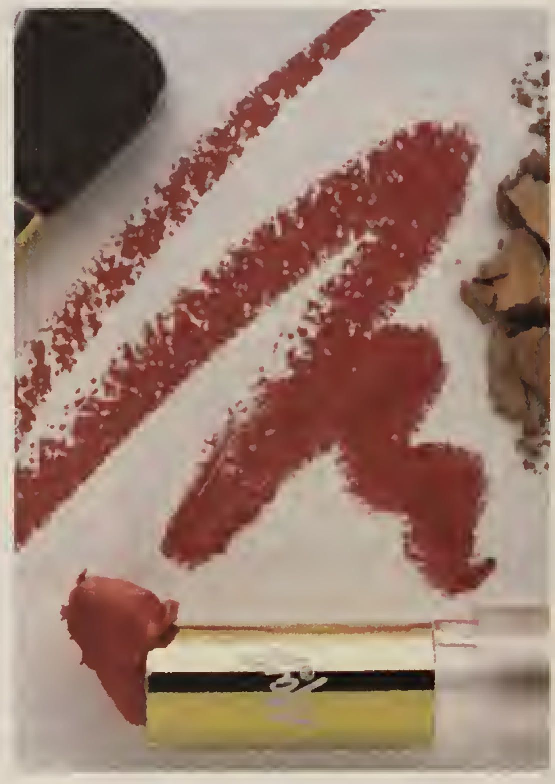


MAX FACTOR DID.

Max Factor's international operation has that vibrant glow about it. And Cullinet's Manufacturing System (CMS) software helped make it that way. The largest producer of its kind in Europe, Max Factor currently offers over 1,300 different cosmetics and fragrance items. Unit totals exceed 55 million annually. The key to success in the industry? Max Factor people believe it is keeping inventories low while at the same time maintaining a high service level on customer orders. CMS does just that. It's an advanced MRPII system that gives the 800 manufacturing and distribution personnel at the huge U.K. plant the capability to plan, control and react to real-world changes in a variety of manufacturing environments. Inventory and service objectives have become easy to attain. And the software has paid for itself in very defined terms over a short time. In the next five years, they plan to save five times their original investment. Obviously, CMS allows the best possible use of resources so that Max Factor, Ltd. just keeps looking better every day.

KAYSER-ROTH DID.

As America's second largest manufacturer of hosiery for men and women, Kayser-Roth understands that support is a key component of any software solution. That's why they selected the Cullinet Manufacturing System (CMS) featuring the Implementation Workbench for Manufacturing. This package of expert-based application and sophisticated implementation tools will enable Kayser-Roth to achieve an overall integration of information among departments. Their data exchange plans extend from PC to mainframe to user tools – between headquarters, multi-site plants and warehouses. Kayser-Roth's corporate managers use the Implementation Workbench for Manufacturing to enhance their implementation efficiencies, project planning and scheduling. Access to project status data helps meet target projections. CMS also provides superior on-line user documentation, interactive training and data conversion instruments, giving Kayser-Roth a most valuable tool for achieving its goals.

DIGITAL DID.

Digital Equipment uses Cullinet software to distribute Digital products. That's one of the highest compliments they could pay. Cullinet's Distribution Management System has allowed Digital to achieve real warehousing flexibility, because the same software can be utilized at multiple sites and still be tailored to the needs of each individual one. The ability of the system to be networked nationwide has provided Digital with the interconnectivity they were looking for. It has resulted in an optimum level of performance – one that has dramatically increased inventory turnaround. And Digital feels that Cullinet's vendor performance has been equally impressive. The distribution personnel say their success is shared with Cullinet – people who have become more like colleagues than vendors. Five Distribution Management products are available to companies like Digital: Order Management, Warehouse Management, Distribution Resource Planning, Distribution Center Management and Sales Forecasting. Digital knows how important these products are. Their clients believe that "Digital has it now," and Cullinet helps keep it that way.

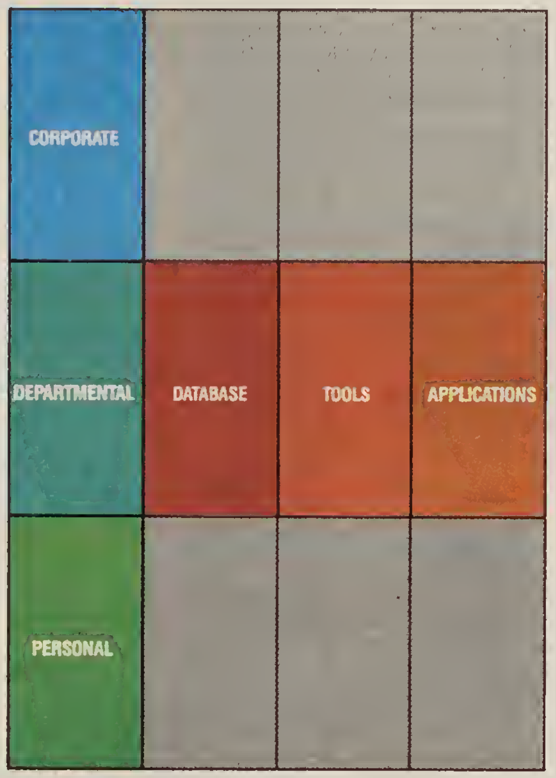
RLD CLASS
AND DISTRIBUTION.
CULLINET.

LHTEC DID.

The Light Helicopter Turbine Engine Company (LHTEC) did not exist as an entity until the U.S. Army instituted its T800 Full-Scale Engineering Development Program. T800 is the designated propulsion system for the LHX program to ultimately upgrade the Army's entire fleet of light helicopters. To accomplish that task within the Army's production competition strategy, the Garrett Turbine Engine Company of Allied Signal and the Allison Gas Turbine Division of General Motors joined resources for the Full-Scale Development (FSD) portion of the program. Even though these companies will become competitors during the production phase, FSD required they function as one, with a management process featuring fully integrated software and a state-of-the-art performance measurement control system. Cullinet's Manufacturing System (CMS) with EASYTRAK enabled easy linkage of files from cost, scheduling and technology standpoints. This project was accomplished across an 1,800-mile distance, with both partners having equal access to vital information simultaneously. And Cullinet managed to deliver up to 70% more savings in day-to-day operational costs than any competitive vendor LHTEC considered.

TECH FORM DID.

Tech Form Industries makes tubular exhaust components for automotive production. And when they needed a repetitive manufacturing system coupled with an automated release package, an exhaustive search led them to Cullinet's Repetitive Manufacturing System. This on-line, closed-loop, MRPII System software runs on VAX as well as other departmental platforms. Because of its exceptional automation of workflow and documentation, it is helping TFI meet the growing needs of original equipment automotive manufacturers around the world. Timely information turnaround has given Tech Form better tracking of investment balances. They can interface financial reporting with shop-floor data reporting systems. And because it's a stand-alone, in-house system – not a tie-in with an outside mainframe – it lets TFI realize the tremendous savings inherent in departmental, one-site computing. TFI products contribute to the performance of scores of domestic and foreign cars and trucks. And Cullinet's Repetitive Manufacturing System is helping to keep the company on the road to greater profitability.



3X3 ARCHITECTURE.

An investment in a truly integrated information management system is one of the best investments a company can make. And the investment in Cullinet is easier to justify than ever, because only Cullinet's 3x3 architecture offers an "industrial strength" database, comprehensive tools and more than a dozen fourth-generation business applications. Those include Project Management, Distribution Management and Manufacturing for both IBM and DEC VAX systems. Finance and Human Resource applications provide additional breadth. All of them are engineered to work together for total corporate computing solutions. System portability and referential integrity are assured – with connectibility between PCs and departmental computers, and SQL compatibility across a three-tiered platform. Get the complete Cullinet technology story in our new IDMS/87 brochure. Call toll-free 1-800-551-4555. Or write to Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

Cullinet

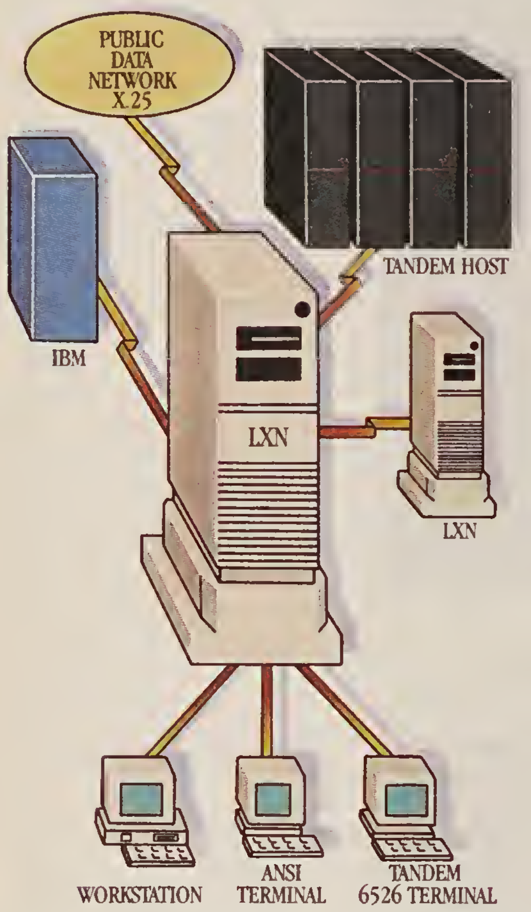
An Information Technology Integrator
For The 80s, 90s And Beyond.

LXN.™

Our lowest-cost system integrates UNIX™ into the Tandem OLTP network.

GOOD CONNECTIONS.

The LXN system integrates easily into the Tandem transaction processing network. You can access both Tandem host applications and UNIX applications, as well as other hosts through SNA or X.25. You can connect PCs to LXN through Ethernet LANs, then LXN to other systems. A MS-DOS file server provides availability benefits of LXN to PC users.



HIGH AVAILABILITY.

Tandem is the first to bring OLTP features to UNIX in this price range. The system can support two mirrored disks. If one fails, the other takes over. In case of power failure, an uninterruptible power supply will run the entire system for up to five minutes. It will also send everything in memory to disk. When power is restored, auto restart resumes where you left off, maintaining data integrity.

APPLICATION POWER AND PORTABILITY.

Now you can run your UNIX applications and access the Tandem OLTP network—all from any workstation. The power comes from a 32-bit microprocessor. It's backed by a 1.6 megabyte floppy disk drive, 80 or 170-megabyte hard disk storage and a 60-megabyte streaming cartridge tape drive.

EASY TO EXPAND.

As you add users, add processor and memory boards. In a fully configured system, memory can expand to 16 megabytes, with 510 more megabytes of hard disk storage. LXN can support up to 32 users and take a huge workload off your mini or mainframe.

EASY TO SERVICE.

A menu-run test allows office workers to check out the entire system. All key components are field replaceable. Diagnostics can be run locally or remotely from a Tandem service center.

EXTEND YOUR TANDEM NETWORK. OR START ONE.

Now it's easily affordable. Whenever there's a need for constantly current information, efficient expandability and unbeatable price performance, Tandem technology proves consistently superior. Compare us to any other OLTP system. You'll see why companies in every major industry choose Tandem.

For information, write: Tandem Computers Incorporated, 19191 Vallco Parkway, Loc. 4-31, Cupertino, CA 95014. Or call 800-482-6336.

TANDEMCOMPUTERS
The technology leader in on-line transaction processing.

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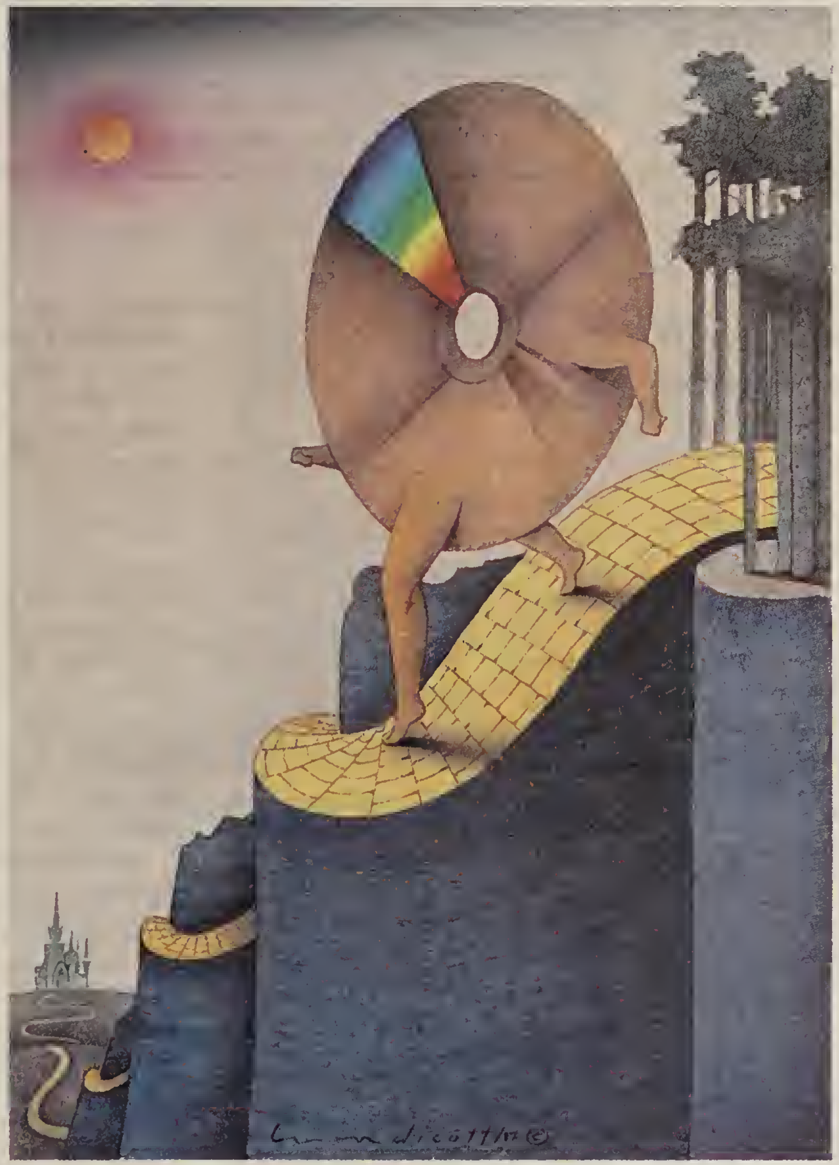
EXECUTIVE REPORT

OPTICAL DISKS

Optical products inching their way to market reality



JAMES ENDICOTT

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CD-ROM standards under control
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BY BARBARA SEHR

Gary Hill's superiors at Dun & Bradstreet Corp. were not impressed in 1983 when he showed them what a fledgling new technology called compact disk/read-only memory (CD-ROM) could do for the company's numerous financial and consumer data bases. But this rejection did no more to dampen Hill's enthusiasm for the technology than the Boland Amendment did to temper Ollie North's zeal for aiding the Contra resistance in Nicaragua.

Hill, a vice-president and general manager of the corporate financial giant's Donnelley Marketing Information Services arm, launched an internal project to publish a consumer market research data base on CD-ROM disks. The project, it turned out, was quite successful. "Once [top-management officials] saw what we had, they fell in love," Hill recalls.

Indeed, Donnelley's revenue figures already indicate that the CD-ROM data base is having its effect on the company's distribution plans. Where on-line charges once represented 75% of the revenue in Hill's department, that figure is now down to about 2% of revenue. "I have no plans to go back to time-sharing," Hill says.

Hill is a pioneer in the new world of optical technology. But are he and other pioneers on a collision course with market reality, or are they the forefathers of still another technological revolution? The answer is that while its beginning has been slow, optical technology seems ready to make its move — standards, software and user security permitting.

In fact, there is no shortage of MIS interest in optical storage. Because of an explosion in graphics-intensive applications, magnetic media is stretched to its limits. One user facing this crisis is Gary L. Porter, systems analyst at Jeppesen Sanderson Corp. in Englewood, Colo. Jeppesen Sanderson, responsible for 90% of the graphics-generated navigational maps used by commercial airlines, is choking on 1.2G bytes of magnetic disks. For Porter, optical storage promises gigabytes, even terabytes, of on-line storage within a single system. But it also leads to confusion and other drawbacks.

The navigational maps published by Jeppesen Sanderson must be stored and revised every 28 to 56 days, some with major, some with minor changes. Today's optical storage is not erasable: Once a laser image is burned onto a disk, it is permanent. Should the company wait for an erasable optical disk? Porter says his application can't.

But, he says, an even larger roadblock bars the technology's progress. There is a decided lack of standards in the industry, something Porter says must be corrected before his company decides to take the optical plunge. "We've gotten ourselves into trouble before because of nonstandard storage systems," he says.

Porter's skepticism is understandable — from the beginning, the optical storage industry has been plagued by unfulfilled promises and unmet delivery dates. If the technology finally seems ready to make real strides in the marketplace, it may be because the industry's biggest names are joining the fray. IBM and Digital Equipment Corp. are both set to enter the field.

According to published reports, DEC will step into the optical arena at the high end, with a jukebox product slated to be introduced at Decworld next month. The product will be sold as a document-imaging system, combining features developed in-house with hardware acquired from outside of DEC. IBM, on the other hand, has already entered the market at the low end, offering an optical-disk peripheral with its Personal System/2, which was introduced last April.

Optical storage of all kinds comprises a technology that has battled user resistance but is now starting to discover its application potential. Indeed, up until recently, optical technology vendors have sold more shiny forecasts than shiny disks. "This is not a technological revolution in the same sense of word processing systems replacing typewriters," says Richard Fisher, an independent consultant with Kalthoff-Fisher Associates, Inc. in Santa Clara, Calif. "This is an additional option that won't replace anything."

Optical technology can be divided into three categories. Most attention in the last year has focused on CD-ROM, which has thrived primarily at the personal computer level as a multimedia storage device that complements, rather than replaces,

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Sehr is a free-lance writer based in Seattle.

Inching

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existing PC storage peripherals.

Write-once read-many (WORM) disks, on the other hand, are emerging as alternatives both to the image-storage capabilities of microfiche and microfilm and the archival storage of magnetic tape drives. A greater threat to magnetic storage, however, is erasable optical disks, which are still in the development stage. Most observers do not expect this technology to be available in production quantities before 1990.

CD-ROM off the ground

CD-ROM technology, boosted by the explosive popularity of its audio parent, appears finally off the ground floor and ready to lead users down the optical path.

CD-ROM disks are made of reflective metal, which records information in digital form, creating a series of microscopic pits and adjoining spaces arranged in spiraling tracks. Each disk contains 16,000 tracks per inch, and each disk is approximately 4½ inches in diameter.

Despite its large storage capabilities and the joint marketing and development efforts of two of the world's largest electronics manufacturers that developed CD-ROM — Sony Corp. and Philips N.V. — the technology did not win instant acceptance by users. In its early years, from around 1983 until 1985, CD-ROM was like the high school cheerleader everyone was afraid to ask out for a date.

However, once users discovered that this attractive phenomenon had a personality, its dance card began to fill up with applications and new ideas. For instance, MIS and PC managers are finding that CD-ROM provides a means of distributing 600 million characters of data — equivalent to 175,000 pages of ASCII text, plus indices — to any end user with a microcomputer and a $700 drive.

Whereas today's average PC random-access memory is about one megabyte or less, CD-ROM can expand ROM available on PCs to more than half a gigabyte. With the ROM supplement, applications once unheard of become a strong possibility.

Already, Microsoft Corp. has introduced Bookshelf, an on-line reference source that, on a single disk, includes the contents of major reference works, including a national ZIP code directory, *Bartlett's Familiar Quotations*, a thesaurus and a manual of style. Other on-line reference facilities in the works from other vendors include a medical reference guide for physicians and a legal precedence guide for attorneys.

CD-ROM's focus has turned away in the past year from the more ambitious applications of on-line multimedia encyclopedias and graphically enhanced video games. In the corporate world, the technology has set its sights on converting on-line data bases to CD-ROM. Currently, most of the data bases converted have been volumes that are less frequently updated, such as biannual catalogs, quarterly financial information and the like.

But even with these maturing applications, growing up hasn't been easy for CD-ROM technology. According to Ed Rothchild, chairman of San Francisco consulting and market research firm Rothchild Consultants, CD-ROM shipments dropped to 8,000 units in 1986, compared with 12,000 shipments in 1985, probably due to confusion about the technology. However, Rothchild says the tide has been stemmed by standards developments (see story page 67). His organization recently increased this year's forecasts of 25,000 units shipped to 38,000 units.

And as shipments have gone up, prices have come down. CD-ROM has already experienced the beginning of a price decline as the technology begins to mature (see chart page 58).

Lower prices notwithstanding, the lack of standards has been a major hurdle on CD-ROM's acceptance track. More than any other optical technology, interchangeability is critical to CD-ROM. Fortunately, the largest manufacturers of CD-ROM players, media and software — as well as some influential observers — convened at Lake Tahoe, Calif., to develop what has become known as the High Sierra standard. The result is a disk format that can be played on any CD-ROM player, just as a compact disk can be played on any compact-disk player.

This means that people like Hill will eventually be able to publish a Dun & Bradstreet data base that records the spending habits of consumers in a particular demographic area and that the manager of the local K Mart or the national advertising manager of Proctor & Gamble can access the data at his own convenience and at his own rate of speed — without worrying about running up on-line costs. The disks can be distributed through the mail — like a floppy disk — and at far less cost than the weighty printed manuals that once held the data base.

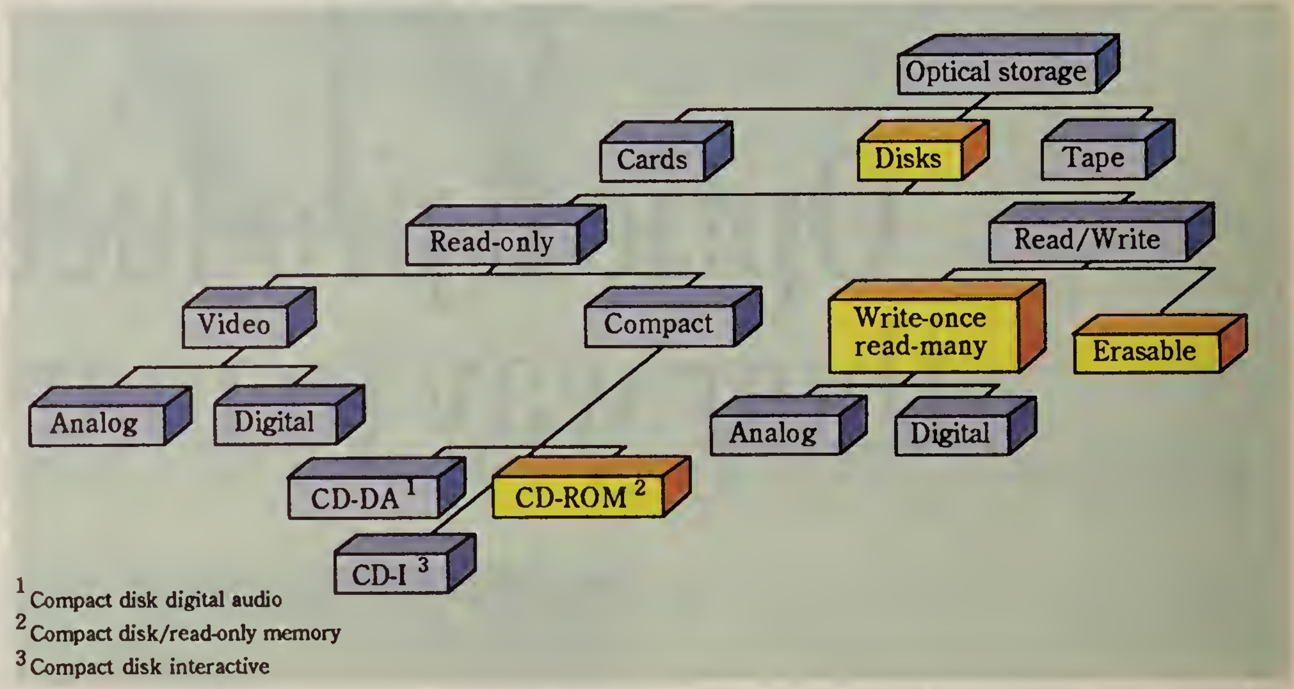
WORMs

In theory, WORM disks feature removability, ruggedness and massive data storage capacity

Continued on next page

Optical storage technology tree

Optical disks are the most mature of the three types of optical storage; CD-ROM, write-once read-many and erasable disks are the most viable technologies for MIS/DP applications



1 Compact disk digital audio
2 Compact disk/read-only memory
3 Compact disk interactive

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CW CHART

Selected optical product implementation forecast

Optical products will see widespread use in the next three years

Product type	1982	'83	'84	'85	'86	'87	'88	'89	'90	'91
Digital videodisk		★	✪		☆					
CD-ROM[1]			★	✪	☆		✩			
CD-I[2]					★	✪	☆		✩	
Optical ROM					★	✪	☆	✩		
Write-once optical disk	★			✪	☆		✩			
Erasable optical disk			★			✪		☆	✩	
Hard-disk cartridge	★		✪	☆		✩				

[1] Compact disk/read-only memory
[2] Compact disk interactive

KEY
★ Prototype demonstrated
✪ Samples available
☆ Production manufacturing of units
✩ General usage of technology

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CW CHART

The IRS is asking the question: Is seeing believing in courts of law?

Are optical images acceptable as evidence in a court of law? It may not seem a critical question today, but interest in the legality of optical storage of images is likely to accelerate in the next few years.

According to a recent survey done by Richard Fisher, an independent consultant who performed the survey for The Yankee Group in Boston, between 100 and 150 document-imaging installations exist today. Fisher projects that number will increase about 75% per year, which he says "may not sound like much compared with the 100% and 200% growth once experienced in the personal computer market, but it is still quite healthy."

And according to Frank Moore, chief of the Laser Technology Center at the Information Systems Development section of the Internal Revenue Service in Fresno, Calif., the legal issue is one of the more important ones to be considered before the IRS's optical disk program is expanded.

To date, there has been no court ruling on the legality of images stored on optical disks. However, Moore says, the IRS has received general assurance from its own legal counsel and the U.S. Department of Justice that images stored on optical disks fall under the provisions of the Uniform Paperwork Act. Accordingly, the National Archives, responsible for paper management within the federal government, has authorized the IRS to destroy original returns when images have been stored on optical disks. Moore emphasizes, however, that no original returns have been destroyed in the pilot program.

The opinion of the IRS legal counsel conforms to the belief of Robert S. Williams, president of Cohasset Associates, a Chicago management consulting firm that deals with record management. Williams is about to publish *Legality of Optical Storage*, a book that explores the legal considerations of optically stored images.

Williams says a "very good case" can be made for the admission into evidence of images stored on optical disks, just as evidence submitted on microfilm and computer printouts have been admitted in previous cases. Williams adds that it is too early for a court test.

Only one state, New Jersey, has so far considered any legislation specifically outlining guidelines for the admissibility of optical disk images. The bill, introduced in the 1986 session of the New Jersey legislature, has not been adopted into law to date, Williams says.

BARBARA SEHR

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Typical turnkey optical filing systems

The characteristics of optical disk-based filing systems vary widely

	Tab Products Co.'s Laser Optic 2500	*Tab Products' Laser Optic 1000*	*3M Co.'s Docutron 2000*	*Filenet Corp.'s System*	*Laserdata, Inc.'s Laserview*	*CIE Systems, Inc.'s Optical Filing System*	*Canon U.S.A., Inc.'s Canofile 5500*	*Fuji Photo Film U.S.A., Inc.'s OD System*	*Minolta Corp.'s MIIIMS*	*Philips N.V.'s Megadoc*
Disk size (diameter)	12 in.	5¼ in.	12 in.	12 in.	12 or 5¼ in.	12 in.	8 in.	8 in.	8 in.	12 in.
Disk capacity (page images)	60,000	5,000	60,000	45,000	Varies	60,000	33,000	15,000	15,000	45,000
Scanner resolution (pixel/in.)	200 or 400	200	200 or 400	200	300	200 or 400	200, 300 or 400	200 or 400	200 or 400	200
Maximum document input size	B4	Legal	A3	B4	A4	B4	A3	A3	A3	A3
Scanning time (A4 page)	5 sec.	12 sec.	3 sec.	4 sec.	5 sec.	5 sec.	5 sec.	6 sec.	3 sec.	5 sec.
Microfilm scanner	No	No	No	No	No	No	Yes	Yes	Yes	No
Video resolution (pixel/in.)	200	100	200	100 or 200	150 or 300	200	200	200	200	200
Video display size (diagonal)	15 in.	15 in.	17 in.	20 in.	15 in.	15 in.	15 in.	15 or 20 in.	15 in.	15 in.
Printer resolution (pixel/in.)	400	300	400	400	300	400	400	400	400	200
Printer output (maximum document size)	B4	Legal	A3	A4	A4	B4	A3	A3	A3	A4
Jukebox retrieval unit	Option	No	Future	Yes	No	Option	Option	Option	No	Yes
Availability in U.S.	Now	Now	Now	Now	Now	Now	This year	Uncertain	Uncertain	Withdrawn

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CW CHART

Inching

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capacity within a small form factor. Even the 12-in. optical cartridges require only a fraction of the archival storage space taken up by the standard 10-in. magnetic tape reels. They do not have to be threaded and can be maintained under less than ideal computer room conditions.

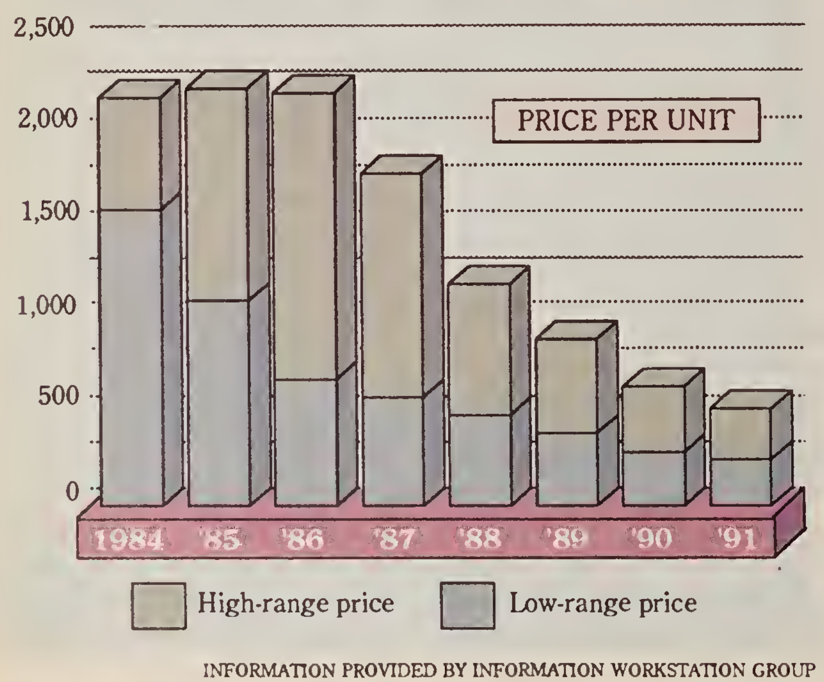
Recording on WORM disks does not require special mastering procedures, as CD-ROM does. There are several recording technologies, but most involve a laser burning pits into thermally sensitive recording material. Information from video scanners, keyboards, optical character recognition equipment and other devices can be recorded on WORMs.

While more sophisticated than their magnetic cousins, WORM disks do not enjoy the fast access time of magnetic media, and users are very much wedded to their tape libraries. Some users may balk at a 100- to 200-msec access time, having been accustomed to access times between 17 and 50 msec for magnetic media.

However, for someone like Charles Plesums, acting director of systems research at the United Service Automobile Association (USAA) in San Antonio, the access time of optical disks can be an advantage. The USAA is a national insurance company that underwrites the automobiles of military officers.

CD-ROM drive price forecast

By 1991, CD-ROM drive prices should plummet to $500 or less



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CW CHART

Until recently, correspondence between the insurance company and its clients was stored on microfilm. "There is quite a difference between searching 100 msec for something on an optical disk and several hours of searching through microfilm," Plesums says.

Legal requirements force insurance companies like USAA to keep all correspondence regarding a claim in storage for many years. The combined graphics images would take up far too much space on magnetic disk or tape. "There is no other alternative for us than optical storage," Plesums notes.

What is the price?

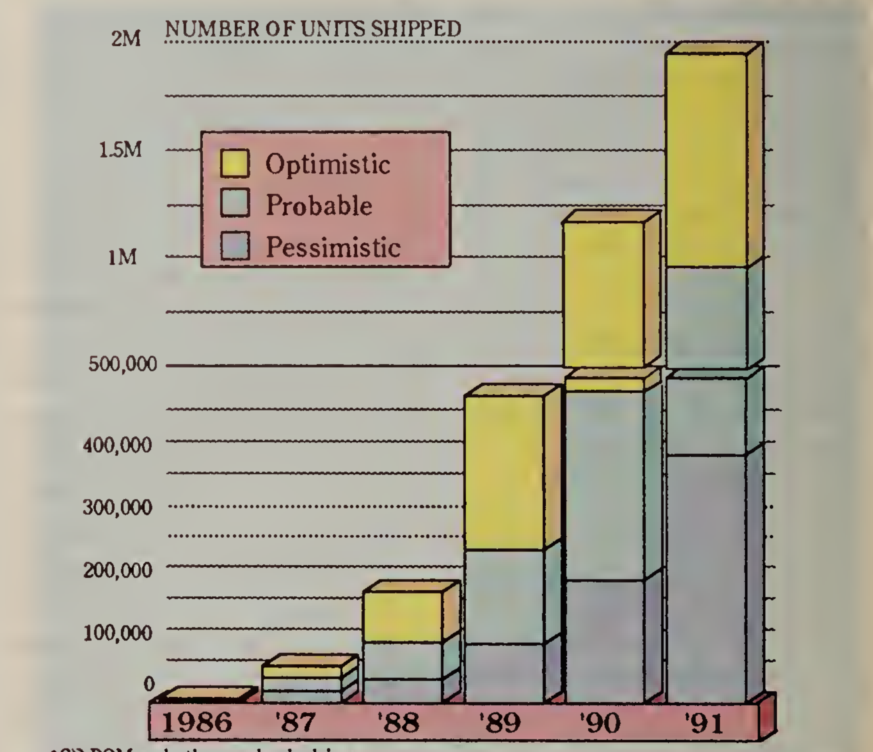
While optical disks represent a major savings to storage-intensive applications like Plesums', the initial cost of WORM systems and media also represents key considerations that determine whether the technology can meet its full potential. Today's WORM systems can cost anywhere from the $6,000 system integrated into the PS/2 to the multimillion-dollar levels of custom jukeboxes.

Price, however, may not be a barrier to a huge corporate institution seeking record management savings, such as the Internal Revenue Service. In fact, Rothchild Consultants has estimated that the cost per megabit for a 12-in. WORM disk is only a penny, half that of 6.25 bit/in. magnetic tape reels. It is, however, 10 times the cost per megabit of microfilm, according to a Rothchild survey.

It has been four years since the first WORM drive rolled off the production line at Storage Technology Corp. in Louisville, Colo. According to Rothchild Consultants, there were only 13,500 drives shipped worldwide between then and the end of 1986 — a figure that would hardly represent a day's shipment of magnetic drives today.

Optical drive* market forecast

The optical drive market should zoom to nearly one million units shipped by 1991



*CD-ROM and other read-only drives

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Shipments of 5¼-in. WORM disks alone are expected to exceed 25,000 units this year, while 12,000 12-in. disks are forecast by Rothchild. This reflects the sharpened interests in WORM disks as a result of document-imaging applications like the USAA's and one in test mode at the National Archives (see story page 63). Office automation specialists see great potential in the enormous capacities available within a single optical disk and the huge jukeboxes already in service. Fisher estimates that the document-imaging market will grow from about $100 million this year to $1.25 billion in 1990. "That's not explosive growth in PC terms," Fisher says, "but it's nothing to sneeze at."

Most of the document-imaging systems use jukeboxes with more than one optical platter. A jukebox is a rack system similar to the disk packs of another time that could allow several hundred

Continued on page 62

New toy: Even the military is training with videodisks

BY JANET FIDERIO

The med students gather around an IBM Personal Computer AT equipped with hard disk, touch-screen monitor and videodisk player. An image of a patient being wheeled into an emergency room appears on the screen.

It is up to the students to provide acute care for the patient and stabilize his condition. By touching the screen and choosing items from a menu, they gather information and direct treatment. Suddenly, however, the patient's condition worsens; the students watch as the patient slips into shock — a result of their misdiagnosis.

The Clinical Simulator System described above, created by Intelligent Images, Inc. in San Diego, is one of a new category of training products that combine optical technology — namely laser-imprinted videodisks — with sound, PCs, color monitors and a sampling of computer-assisted instruction techniques.

The products are designed to be interactive and to provide feedback. For example, the Clinical Simulation System not only recreates emergencies; it then records student actions as they respond to situations. At the end of each acute-care simulation, students are provided with printouts that track the treatment session's sequence and time of actions. The system will tell the students what the correct diagnosis and treatment plan should have been and, if requested, compare what the students spent on medication, laboratory tests, X-rays and so on with what experts would have spent caring for the same patient.

Not a flash in the pan

Intelligent Images, and vendors of similar systems that address the industrial, technical and MIS markets, is betting that these products are the answer to our technical training needs. And the market figures seem to agree. According to Rockley Miller, editor and publisher of "The Videodisc Monitor," more than 111,000 industrial videodisk players have been sold into the U.S. nonconsumer market. One-third of these systems are found in the industrial training arena, and about half of those are used solely in the auto industry. Another third are scattered across medical, government, military and other education markets. Nearly all of the remaining systems are used in entertainment arcades.

One major indication of this market's stability is IBM's recent arrival, with its Info Window hardware package. In typical IBM fashion, Miller notes, "[Info Window] has provided stabilization among software support tools — the vast majority of the authoring packages that are used to develop courseware have added support for IBM."

Yet another indication that the market is more than just a flash in the pan is the U.S. military's interest in the technology. In one of the largest videodisk contracts to date, the U.S. Army recently signed an agreement with Matrox Electronic Systems, Inc. in Montreal for 47,900 electronic information delivery systems.

In the industrial and DP corner, videodisks are also making an impact. At 3M Corp., five interactive videodisk systems provide technical training in electronics, math, robotics and hydraulics — while in the learning center, one system provides training for MIS-related courses. According to Jim Gumbusky, human resources development manager for manufacturing at 3M's St. Paul, Minn., facility, interactive video systems can tailor training to the ability of the individual. While fast learners can whiz through the lessons, those having a bit more difficulty can take their time. "The important thing is that [employees] obtain the tools you want them to have," Gumbusky says.

Gumbusky says that he sees interactive video as a supplement, not a replacement, for stand-up training. "Adults are more comfortable with the self-paced [videodisk systems] than with the classroom, because they aren't in a situation where their peers are chiding them. Also, if they are having trouble understanding the material, they can go through it again."

Miller notes that MIS should not overlook the fact that some of the most extensive libraries of existing courseware for interactive video systems deal with fairly sophisticated computer topics. "The availability of this type of courseware — the kind that can bring people in and get them up to speed on new system configurations or software — could prove to be extremely valuable," Miller says.

"Videodisk is the newest toy for many MIS people," adds Margaret Sullivan, president of Practical Training Solutions, Inc., a Chicago-based consultancy. "There is an entertainment factor with video that you don't have with other forms of training. In terms of actual training effectiveness, most of it tends to come with the entertainment value — the more students enjoy what they're doing, the more they're going to retain." •

Fiderio is a *Computerworld* senior editor, features.

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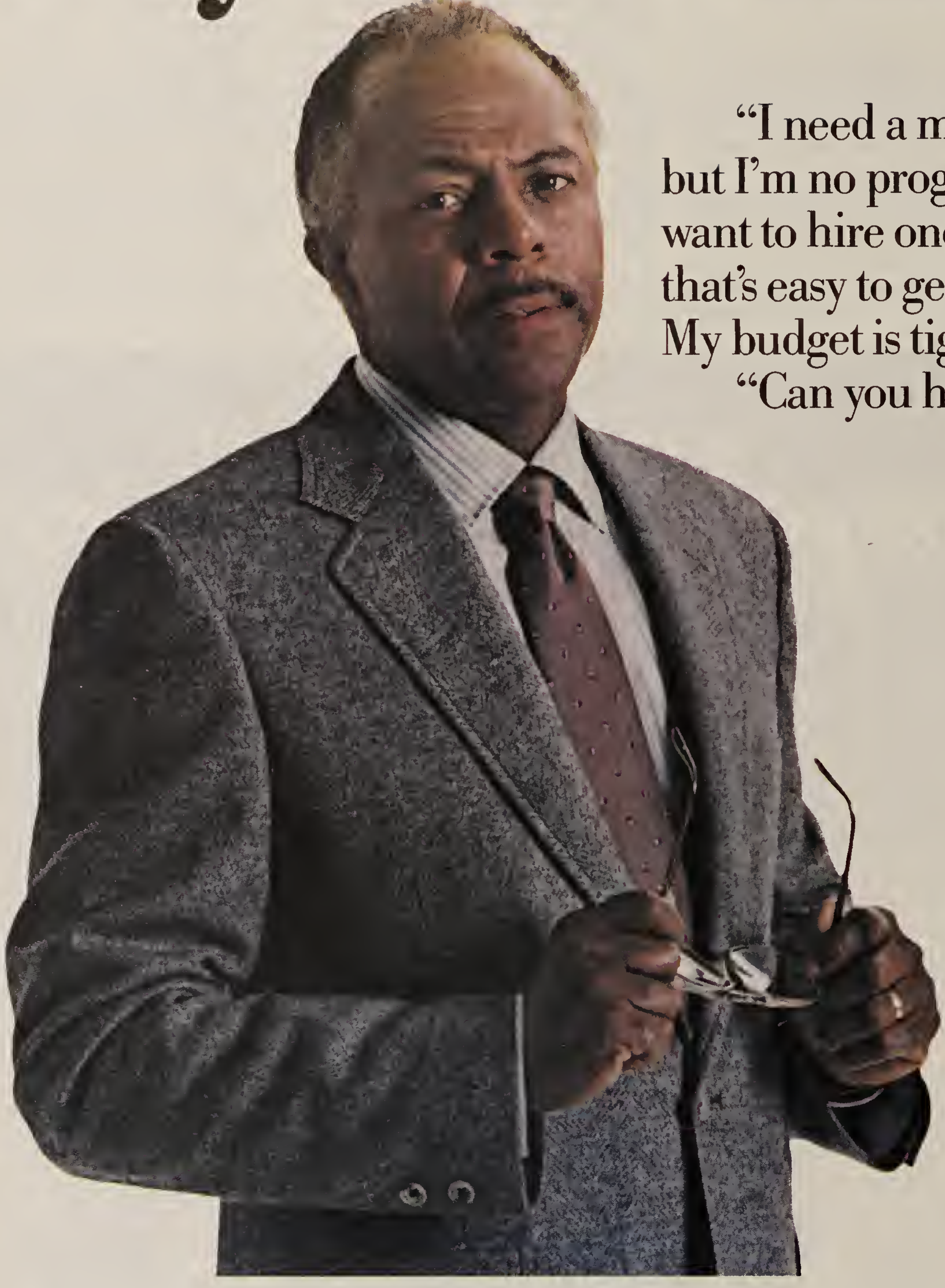

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FROM PAGE 58

optical platters to be mounted into a rack that is hooked into a single controller. The result is the hundreds of gigabytes of storage capacity required for the storage of graphics images.

Document imaging is simply the preservation of complete documents in which graphics and text are digitized into machine-readable form that can be recalled on a high-resolution VDT. Until the entry of the WORM disk, microfilm and microfiche provided a state-of-the-art alternative to storing reams of paper documents. The primary drawback of microfilm, however, was its time-consuming sequential, rather than random, access. Even the relatively slow random access of WORM disks appears superior when compared with a search through reel after reel of microfilm.

Banking, insurance and government — all paper-intensive businesses — are the primary targets for document imaging on optical disks. According to Fisher, the most important development in these corporate environments has been the return of technologically sophisticated MIS personnel to the evaluation, testing and application decisions surrounding the use of document-imaging systems. He notes that the significant costs both of the optical storage systems and the high-resolution terminals necessary for document retrieval have revived the importance of MIS decision making.

USAA's Plesums, like Hill, had the time and responsibility to experiment with new ways of solving old problems. Unlike some users, he had the technical ability to enhance raw products still in their infancy and provide manufacturers with experienced user input.

In 1986, Plesums had a turnkey optical disk system from Filenet Corp. in Costa Mesa, Calif., installed at USAA headquarters. The system, which cost more than $500,000, features a jukebox with several hundred gigabytes of storage capacity. The system also features removable disks that can be stored until needed — for example, when a customer inquiry needs to be checked.

USAA's Plesums

"Instead of having to get back to a customer perhaps the next day with requested information, the operator can access the information in seconds and give the answer right over the phone," Plesums adds.

No match for IRS

While Plesums' paper congestion problem would seem huge to most users, it is no match for Uncle Sam's own IRS. Frank Moore, chief of the Laser Technology Center at the Information Systems Development section of the IRS, says that more than 1.5 billion documents are currently stored in IRS files, at a total cost to the government of some $40 million so far. The congestion arises because federal law mandates that the IRS keep originals of forms such as the familiar 1040 for various lengths of time. For example, while personal income tax forms must be kept for a little less than seven years, corporate income tax returns must be stored for 75 years.

In a pilot program at the IRS service center in Fresno, Calif., a custom-designed set of three jukeboxes with WORM disks capable of storing up to 600G bytes of digitally scanned tax forms is now being tested. Taxpayers targeted for audits will be happy to know that when the system is up and the IRS picks out the lucky returns for a closer look, they can be accessed in as little as 30 seconds, where once

Continued on page 64

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INTERVIEW

Archiving the Archives

With space at a premium, the National Archives is installing a videodisk image storage and retrieval system "to store, maintain and make available to the public the records of the federal government."

According to Bill Hooton, director of the National Archives' optical digital image project, the archives' charter reads, "To store, maintain and make available to the public the records of the federal government." With hundreds of thousands of such records, that's a tall order to fill.

Hooton, 36, started in DP at the Internal Revenue Service in 1970, became interested in videodisk for image storage and retrieval and eventually designed a paperless IRS using optical disks. After that ambitious trial project was under way, he moved to the National Archives as part of its high-tech task force. Currently, he is installing the test system that will put the fragile 19th-century personnel documents of Tennessee's Confederate soldiers into an optical storage system put together by Unisys Corp.'s System Development Group. Hooton, who is also chairman of the Digital Image Application Users Group, spoke recently with Kelly Shea, a *Computerworld* assistant editor, about the nuances of the Archives' system.

What needs will an optical imaging system fill at the National Archives?
The biggest need is that we're completely out of space. So we either have to build a new building and/or we have to do something with the existing space.

Number two is a real preservation issue — we don't want to handle those original documents. It's also a real pain in the neck to try to get at the information — of course, any kind of manual filing system would be, especially in terms of the six or seven billion page images of permanent records that we have. And those are the ones we have to keep forever. We have about 15 billion, if you count everything.

So those are two issues, and of course, trying to automate the retrieval is another one.

When this system is up and running, will you put as many documents as possible on it?
Well, not necessarily on this system. This is really an isolated system, intended to be a research test bed. That's why it's so flexible. If we went with a much larger system, we would probably redesign it.

How many users will be able to access this system?
At one time, we'll have four pure retrieval terminals, with the possibility of about eight, because any of these high-resolution monitors — which are also used for quality control and indexing — can be used for anything else. They're strictly controlled by the user profile on the password.

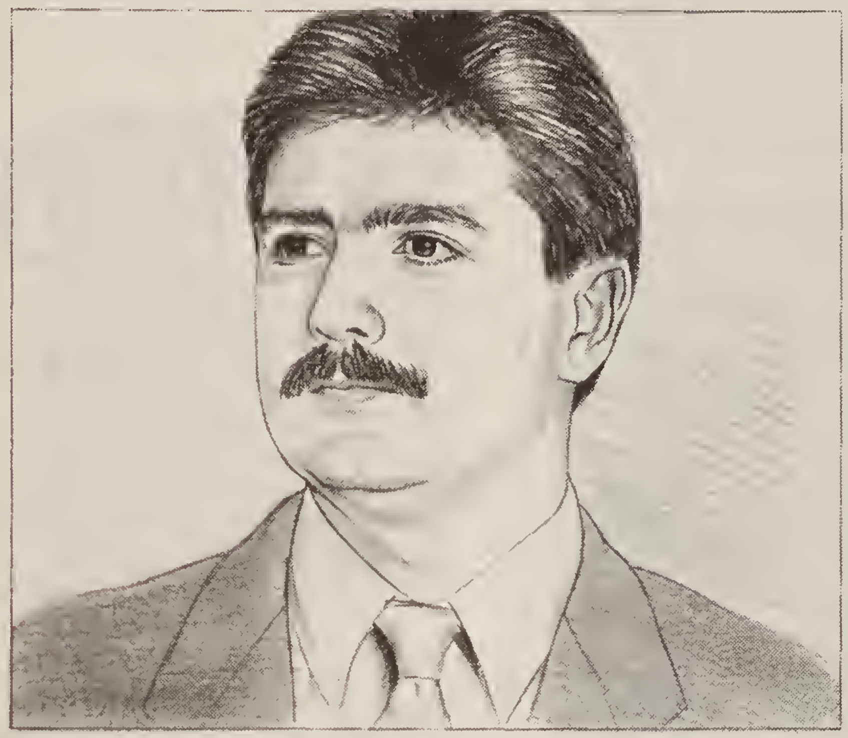
Have you followed the traditional rules of DP acquisition with this system?
Oh yes. There's only one benefit to doing a research test as opposed to a pure production DP-type of an operation, and that is that you don't have to do a cost-benefit analysis before you buy it. Because by definition you are trying to get that information.

Have there been any major problems so far? When do you plan to have this test running?
The date right now for installation completion is Dec. 7. I expect it will be before that.

Everything is going extremely smoothly, much more smoothly than anything I've ever been involved with. This is a $1 million system — actually it's a $4 million system, but we paid $1 million for it because it's advertising for Unisys.

I think the reason things are going so smoothly is that Unisys realizes that they'll either get $30 million worth of advertising if it's a good system, or they'll have to close their doors if it's a bad one.

I'm in a position to tell the world, and I plan on telling the world. So they're working devilishly hard to try and make it a beautiful system. They have done that, and things have been on time, and it's really nice so far. I reserve the right to change my mind on that, though.


National Archives' Hooton

ALAN WITSCHONKE

How will MIS shops interface with such systems?
That's a big political problem these days. It was a big political issue originally at the IRS, because they've got a huge DP division nationwide — we're talking thousands of people. At the IRS, people didn't know where the system fell. Was it a file management system? Was it a DP system? It didn't really fall under a DP procurement, because it didn't manipulate data, it only stored it. Nobody really wanted it at first, but as soon as it caught on then everybody wanted it.

Users don't usually want to do this type of procurement through the normal, huge DP organization because it doesn't get done quickly. It gets put in with all the other thousands of projects and doesn't go anywhere. If it's kept on the user side, driven by the user side and looked at as more of a records management kind of thing, it usually gets done much faster. So that's where people are opting to try and put it. But more and more now I see that it's going as normal DP.

Do you think that that's better? Should it be under the guise of MIS?
Oh I don't know. It all depends on whether it's going to be integrated in with the existing mainframe; if so, then it really should be under DP. If it's a little standalone, office-size thing, it should not be under DP, I don't think.

Will the Archives' system eventually be integrated with DP?
Well, right now we don't have DP. We don't have anything like that. We've got a few people, we've got some small branches and things like that, but we don't really have a large organization. We are trying to reorganize, and eventually we will probably have one giant DP group like everybody else does. But right now it's not a problem. Everything's just being run by this small, high-tech staff that I'm on.

A lot of people say that this is a technology looking for a market. Is it?
I think it was always a technology looking for an application. And I think that users now can look at those test pioneers who took the ball and ran with it at the beginning and say, "Look, it really did work. We don't have to go with some kind of test system for our application. We have a big application, and we can go with a production system." And that, I think, is what's going to turn it around. So it just took time. It always takes time. •

Inching

FROM PAGE 62

it took six weeks of rummaging through files. It also means, according to Moore, that taxpayers with a question about a return filed years ago can have their queries answered in a much faster time. Moore says the present system "can retrieve 30% of the 1.5 billion documents now in storage in Fresno."

The IRS's decision to go with an optical disk system was made in 1984, when the technology was still relatively new. Since then, Moore notes, there has been quite a bit of progress in optical disk technology. Data throughput times have increased, access time is improving, and the cost of the high-resolution terminals that retrieve the images is on the decline. The Fresno project remains a pilot program, however, and "there is no indication that this system will become part of a complete system in the future," Moore says.

Freeman Associates' Freeman

Systems such as those custom-made for the IRS and USAA were designed for highly sophisticated users. As a result, very little emphasis was placed on creating operating and applications software that is entirely user-friendly. Plesums, however, says even his custom system does not pose a major training problem for personnel assigned to its operation. "It's not hard; it's just different," he says.

But for most future users of optical systems, a user shell and refined applications that reflect the write-once limitations of today's WORM disks are key requirements. In fact, software is a barrier even more critical to WORM technology than standards. The software problem with optical disks comes into play in the relationship of the optical drive to the operating system.

Since operating systems were designed with magnetic disks in mind, the operating system has a tendency to want to reuse disk space, which is not possible on a WORM disk. This must be overcome with software that makes the WORM disk transparent to the operating system. A number of systems houses working with various CPUs have developed software to overcome operating systems, including Microsoft's MS-DOS, Unix and DEC's VMS. But more must be done to create transparent user shells.

Erasable disks

Most erasable disks are recorded using lasers to heat magnetized areas coated with various metals. The magnetism provides polarity in the sections, which can then be read with another laser. Data is

Continued on page 66

WORM standards debate breeds world of confusion

How important are standards?

If you own a Betamax or an eight-track tape player, you may have already discovered the importance of standards in a media that must be interchanged among many users. Unlike compact disk/read-only memory technology, however, in which interchange is a key to the success of a disk, the interchange of write-once read-many (WORM) disks is not always necessary.

"[The need for standards] simply depends on whether an application requires the interchange of media," says Richard Fisher, an independent consultant with Kalthoff-Fisher Associates, Inc. in Santa Clara, Calif. "In most of our applications, we have discovered that only a small minority of users requires interchange."

Before the stream of 5¼-in. WORM disk introductions began in 1985, there was little concern for standards in the 12-in. world. Optical disks were rare and expensive, and customers generally did not require interchangeability. "Standards are not as important to our application as a reliable second and third source of media," says Frank Moore, chief of laser technology for the document imaging pilot project within the Internal Revenue Service in Fresno, Calif.

A second source of media is usually required by any systems integrator putting together a jukebox or other optical subsystem. In this way, optical disks are no different from a new semiconductor chip or a new form factor for a magnetic disk drive.

While Charles Plesums, acting director of system research for the United Service Automobile Association in San Antonio,

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T-1 Introduction to CD-ROM Industry, Markets, Futures
This panoramic overview will introduce you to the technology, applications, markets, participants and trends in the CD-ROM industry. You will learn about key hardware and software elements needed to successfully utilize the technology, and criteria to evaluate the cost-vs-payoff equation of CD-ROM applications. **For:** Beginners, users-to-be, and others who want an overview of CD-ROM basics.

T-2 Preparing Databases for CD-ROM, including catalogs and lists
End users or vendors planning a CD-ROM application will find this session invaluable for exploring database formats, indexing, searching systems, display formats and other practical issues. Also included will be the role of consultants and turnkey package suppliers, and problems of maintaining quality and timeliness of information once released. **For:** Publishers and user information systems and records management executives.

T-3 CD-ROM Technology: Hardware
This session covers the equipment technology side of CD-ROM, in the context of information storage sub-systems including magnetic storage, optical discs, erasable discs, CD/I and WORM. Discussions will include laser reading/recording methods and reading and error checking/correction. Drive topics will include standalone, ganged, networked and cartridge operations; production of discs; and aspects of implementing multi-drive, multi-user applications, including interface and service questions. **For:** Technically and product-oriented professionals interested in a systems-level understanding of CD-ROM.

T-4 CD-ROM As An In-House Publishing Application
Attend this tutorial to examine the suitability of CD-ROM as a replacement for paper and microfilm/fiche methods of publishing catalogs, parts lists, service and software manuals, directories and databases of all sorts. Attendees will discuss questions of economics, frequency of updating, transmission costs, security and access, training and equipment/viewer implementation. The session will also compare in-house production versus outside consultants and implementors. **For:** MIS, records management, field support and training professionals.

1:30-4:30 p.m.

T-5 CD-ROM Technology: Software
This session will look in detail at each step of CD-ROM usage via software, beginning with the user interface, indexing techniques, interaction with applications software including MS-DOS Extensions, and implications of standards issues (i.e., file formats, High Sierra, and others). Discussions will include problems of off-CD-ROM use of data and unauthorized reproduction. **For:** Professionals interested in the effect of software on the flow of information from disc to application.

T-6 Authoring Systems Workshop
Register for this session for detailed exposure to the tools needed to create the CD-ROM database, starting with a mass of data and ending with a useable application. You will learn about premastering, mastering, and service/equipment/programming approaches, including alternatives such as in-house and out-of-house consultants and turnkey suppliers. **For:** Professionals with expected responsibilities for managing CD-ROM product development.

T-7 MIS Applications for CD-ROM and Optical Memory
This session examines where CD-ROM fits in the MIS chain. You will become familiar with CD-ROM's suitability for different types of databases, including financial and other numerical bases, with attention to record length, speed, frequency of access, update scheduling, security/integration and backup requirements. Discussions will also include networking of drives, personal computers and other workstations/mainframes. **For:** MIS-experienced and systems/database management professionals.

T-8 Using CD-ROM in Expert Systems
The massive storage potential in CD-ROM, along with its low cost and reliability, make possible advanced expert or artificial intelligence applications ranging from emergency medicine to point-of-sales retail. This session will introduce some of the applications and the problems providers face with CD-ROM equipment in public or severe environments. **For:** Professionals who work with intelligent, educational, or decision-support systems and who plan to use CD-ROM technologies.

> "THE NEED for standards simply depends on whether an application requires the interchange of media."
>
> RICHARD FISHER
> KALTHOFF-FISHER ASSOCIATES, INC.

shares the IRS's requirement for a second source, he says he feels standards in the industry can only help the future of the technology — and especially users. "Standards will give users confidence in the technology and, at the same time, force media prices down as more suppliers emerge," Plesums notes.

But confusion reigns supreme in the brave new world of 5¼-in. optical disks. At a meeting in Portland, Ore., in March, the ANSI X3B11 committee endorsed continuous and sample servo formats.

The sample servo format has become known as "the OSI standard" in honor of its most forceful proponent, the Optical Storage International division of Colorado Springs-based Laser Magnetic Storage International — a joint venture company formed by Control Data Corp. and Philips N.V. The joint venture is joined in the format endorsement by three other major optical disk makers, Sony Corp. in Japan, Alcatel Thomson Gigadisc in France and the Philips & Du Pont Optical Co., a joint media venture.

However, a large contingent of smaller 5¼-in. optical disk drive makers led by Optotech, Inc. in Colorado Springs and Maxtor Corp. in San Jose, Calif., are pushing for the continuous servo.

The continuous servo disk features a grooved media previously used in 12-in. disk drives. Proponents say the continuous format will allow far greater capacities in drives and media in the future. Opponents, however, say the sample servo is technically superior because it allows additional recording space occupied by the grooves of a continuous servo disk. Sample servo proponents say the only reason smaller companies are sticking with the continuous servo is because they made production commitments early on and are unable to afford the high cost of retooling.

The American National Standards Institute (ANSI) is not the only source of confusion on the 5¼-in. optical disk standard. Japanese standards agencies reportedly also will support a dual banner. Observers there say not enough evidence exists at this point to make either standard technically superior.

IBM makes matters worse

In addition, IBM's decision to advance its own format — with its optical disk drive introduced as part of the Personal System/2 — has not made the problem any easier. The IBM disk is closer to the continuous servo than the sample servo, but it does not come close to either.

IBM's optical disk, reportedly manufactured by Japan's Matsushita Ltd., has been both hailed as a long-awaited IBM endorsement of optical technology and condemned by one media manufacturer, who asked to remain anonymous, as IBM's bid to kill the technology forever.

This type of criticism has come from competitors and experienced users of optical disks who say the IBM offering is too conservative. The IBM WORM disk holds only 200M bytes and has a very slow access time. It arrives at a time when magnetic disk technology is pushing past the 1G-byte level and dual-sided 5¼-in. optical cartridges hold nearly 2G bytes.

However, the loudest complaint about the IBM disk is that it fails to adhere to either of the two standards recently adopted by ANSI. Critics say standards are crucial to low-end products like IBM's, and some note that the company has not been as successful in determining low-end storage standards as it has at the high end.

The anxiety in all of this is that standards are far more important at the low end — in drives using the 5¼-in.-and-smaller form factor — than at the high end. The small form factor optical drives, like their magnetic cousins, will be entering applications that are more likely to need some sort of disk interchange. By definition, low-end disks are produced in greater volume and at lower cost and are likely to be distributed over a wider area. As a result, the question of interchange becomes more important, and, therefore, so does the question of standards.

Already there are signs of alarm within the industry. Frederick F. Geyer, program manager of the mass memory division at Eastman Kodak Co. in Rochester, N.Y., says his company has opted for a 3½-in. form factor for its one-of-a-kind erasable optical disk. He says Kodak does not even want to get involved in the 5¼-in. standards war. Instead, it will start from scratch and make its plans known to all, potential rivals included. "We will act responsibly," Geyer insists.

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Inching

CONTINUED FROM PAGE 64

erased by shooting an even more powerful laser at the disk, which reverses the established magnetism.

But where are erasable disks?

Ray Freeman, president of Freeman Associates, Inc., a Santa Barbara, Calif., market research firm, is from the school that contends production quantities will not emerge before mid-1990.

Rothchild disagrees. He says he believes that at least 1,000 erasable optical disk drives will be shipped by Japanese manufacturers later this year. However, he notes that production volumes from Japanese and U.S. suppliers probably will not be available before 1989.

When the age of optical storage began, the ultimate vision was erasable disks, which would combine the large storage capacity of optical media with the write-many-times versatility of magnetic media. Corporate records managers were salivating with anticipation of replacing huge tape-reel libraries with relatively tiny optical media cartridges.

Three possibilities

And the wait continues. A large stumbling block impeding the introduction of erasable disks is media production. Like manufacturers of semiconductors, thin-film heads and thin-film media before them, makers of optical media are experiencing the frustration of getting enough yields to make optical media cost-effective. There are three types of erasable optical media now in development. Magneto-optic is apparently the most advanced in production, according to Rothchild Consultants, but phase-change and ultimately erasable polymer media are likely to follow in quick succession.

Magneto-optic media features a tolerance for a high data rate and broad bandwidth. It has been the media of choice for the Japanese erasable disks now being introduced. Phase-change media allows an even higher data rate and broader bandwidth. It reportedly is preferred for optical video recording.

Erasable polymer is expected to be the lowest in cost of all three erasable media while, at the same time, offering the highest performance. However, this media is still in the experimental stages, and attractive yields have yet to be reached.

Meanwhile, amid the excitement, a funny thing has happened to erasable media on the road to reality. There is now some doubt that these disks are even necessary. "With magnetic disks getting larger in capacity at less cost than optical disks, the only advantage erasable disks will have is removability," Fisher notes. And erasable optical disk drives will naturally be far more expensive than their more mature magnetic rivals.

"The longer it takes erasable disks to get here, the less a market they will have," observes Jeffrey R. Dulude, director of marketing at Optotech, Inc., a manufacturer of 5¼-in. WORM disks in Colorado Springs.

According to analyst Freeman, erasable optical disks are likely to play their most dramatic role as a new form of backup. In this capacity, they will be a logical successor to the low-capacity floppy disks of an earlier era and to the high-capacity tape cartridges of today. "I believe there is room in the market both for WORM disks and erasable optical disks to live side by side," Freeman says.

Ed Rothchild

Hope, not hype

While optical technology has undergone its challenges, it is making progress and cutting through the hype. Ironically, the most encouraging development in the past year has been a hesitance on the part of major drive makers to raise expectations too high. Optical Storage International, the nation's largest shipper of 12-in. disks, has been very sensitive to charges of hype in the industry. As a result, the company is holding back on its announcement of a forthcoming 5¼-in. optical drive until the product gets onto the loading dock.

Although acceptance has not appeared in the dimensions once expected, optical technology is still likely to become evident in everything from home CD-ROM players — which use a different file format — to the massive document-imaging applications of the IRS and the Library of Congress. Optical media may never reach the magnitude of success of magnetic media, however, which has seen floppy disks appearing in K Mart checkout lines.

But the pieces are beginning to come together. In the words of an enthusiastic analyst, Rothchild says, "All of the major technical problems have been solved. All of the pieces needed are in place to turn an interesting technology into a viable, essential and cost-effective tool upon which end users depend." •

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Organizations hash out CD-ROM standards, compatibility issues

BY JOHN GALE

In the compact disk/read-only memory (CD-ROM) arena, several standards and compatibility issues must be resolved before the technology can provide DP shops with the storage capabilities that MIS managers still only dream of. Most of these issues, while not completely settled, are under control through various agencies and vendor companies.

In 1985, the High Sierra Group created a standard to facilitate the use of CD-ROM with operating system file management in a variety of different operating environments. The group then worked with the National Information Standards Organization (NISO) and the European Computer Manufacturers Association (ECMA) until May 1986, when it proposed a file manager standard to the two organizations.

> IBM IS ONE of the few organizations that might be able to install a standard for higher resolution CRTs.

NISO and ECMA each approved the standard, which is currently undergoing final approval by the International Standards Organization (ISO).

This international standard provides for the following:

- A boot block, which enables a computer to boot or initiate processing from the optical disk.
- A volume table of contents. This specifies where files are on the disk and what their names are.
- Expandable logical volumes. An information product can be published as, for example, a two-disk set and then expanded as update disks are added.
- Support for the Philips N.V./Sony Corp. compact disk-interactive file structure.

The NISO/ECMA/ISO standard does not address those issues unique to write-once media, software interfaces for drives, hardware interfaces for drives, hardware standards, indexing of data or user retrieval commands.

It will require additional refinement in the file format arena when read-only disks are developed that are playable on write-once drives or when disks are developed that have read-only as well as write-once sectors.

In addition to standardization considerations, there are several significant compatibility issues that affect CD-ROM systems, including the following:

- In general, vendors support the High Sierra file manager standard. The systems integrator and/or software house dictates the data file and index layout on the disk. This layout has a significant effect on performance for some types of applications.
- There is no standardization of the interface type used by the hardware interface that connects the CD-ROM drive to the computer. The de facto industry standard is evolving toward small computer systems interfaces (SCSI), but not all drives use them at this time.

And unfortunately, not all SCSIs are compatible with each other, so the various hardware vendors have had to work together to resolve this problem. This will continue to be a problem area requiring drive-specific interfacing.

- There is also no standardization of the command set used by

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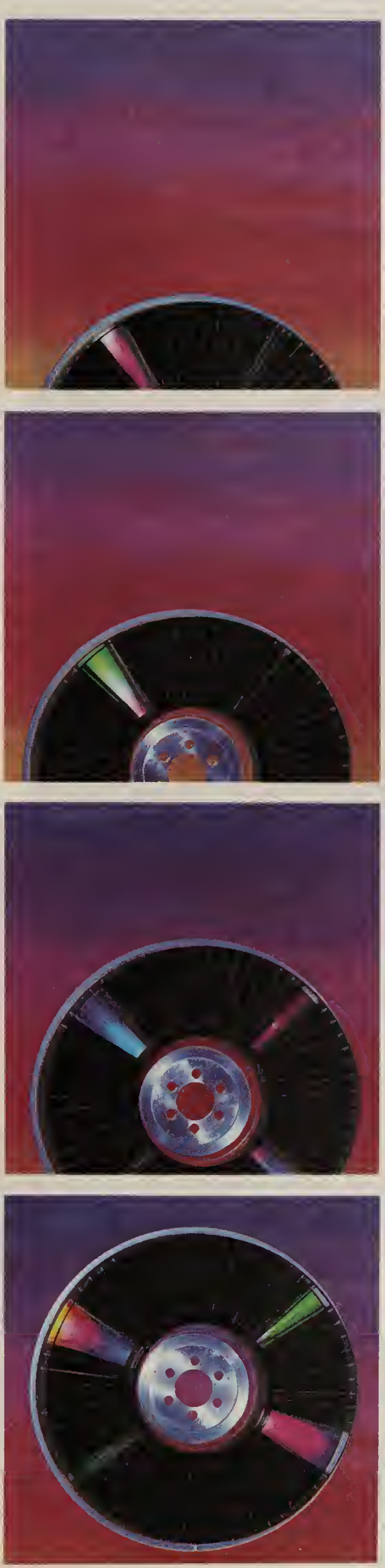
Gale is president of Information Workstation Group, a consulting firm located in Alexandria, Va.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the hardware interface. The result is that each applications developer must provide support for the command sets — and thus the drives — of his choice in a software driver, which he must create.

Developers tend to select drives for support that are widely installed or perceived as providing better or more reliable performance or providing superior support. This means the retrieval software for a particular application may require a certain drive to be available to the end user.

This is being resolved as software houses support more hardware interfaces and, in the long term, as Microsoft Corp. releases its operating system extensions and relieves the software houses of the need to create drivers.

> THE THROUGHPUT capabilities of the LAN are particularly significant for data-intensive applications such as image data bases. Thus, certain applications will perform more acceptably in some LANs than in others.

A few systems that require very high performance will remain and will, therefore, need unique hardware configurations.

- There is currently no standardization of user interfaces, retrieval commands or menus. Such standardization is actually not appropriate, however, as these functions are application-specific within a particular vertical market.

We must distinguish between data bases that support a particular professional task and those that appeal to a broad horizontal market, such as library reference departments.

For example, the needs of the brokerage community are very different from the needs of the owner of a hardware store. The respective end users will have different perceptions of what information is and varying experiences with computer interfaces.

- Index structures are not standardized. This means that a particular retrieval software package can access only data bases indexed using a predetermined subset of that specific package's indexing capabilities.

The retrieval software almost certainly cannot access a data base intended for a different software package.

Software houses regard their index structure as proprietary and as a key means by which they differentiate their product.

If index structures were standardized, the end user would experience a degradation in access capabilities and perceived response time.

The American Association of Publishers (AAP) and NISO are preparing an AAP Electronic Manuscript Standard. This standard might provide a basis for software houses to retain their proprietary indices and to enable a low level of common access to a data base via any retrieval software in which both the software and the data base support the AAP standard.

In addition, it is hoped that the AAP standard will provide low-level common access to data bases frequently found in the reference department of libraries.

Further standardization of index structures is not feasible in light of the need to optimize performance and access techniques at the application-specific level.

> MOST CD-ROM systems use keyboards for entry devices. However, as systems are optimized for the layman end user, 10-key pads and mice creep in as nonstandard devices.

Many CD-ROM-based systems, such as those from Lotus Development Corp., The Library Corp. and Online Computer Systems, Inc., can be used in local-area networks (LAN). The throughput capabilities of the LAN are particularly significant for data-intensive applications such as image data bases. Thus, certain applications will perform more acceptably in some LANs than in others.

There are interesting points of commonality between the extensive imaging needs of optical disks, and more general work is being done in network data base protocols.

Some applications software packages require specific CRT graphics displays for CD-ROM, such as IBM's Enhanced Graphics Adapter. Others include software that is executed in a processor on the CRT interface board. IBM is one of the few organizations that might be able to install a standard for higher resolution CRTs.

Most CD-ROM systems use keyboards for entry devices. However, as systems are optimized for the layman end user, 10-key pads and mice creep in as nonstandard devices.

Some standards organizations have worked to resolve many of these critical issues. A common set of commands for use with write-once read-many drive interfaces has been proposed. This might be desirable for CD-ROM as well. •

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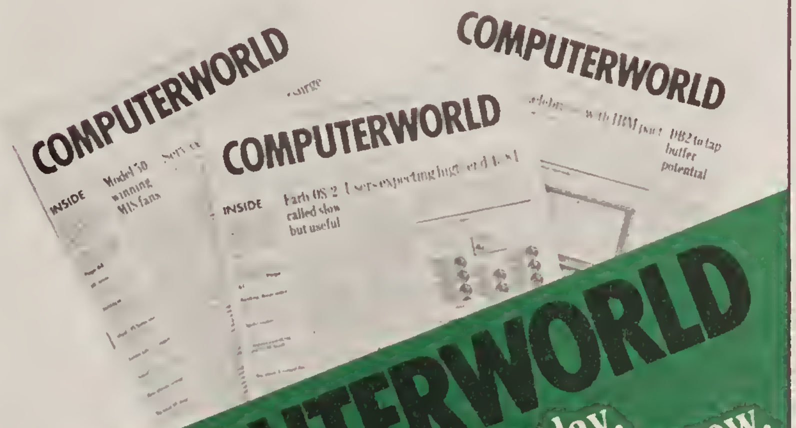
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Your personal computer isn't yours anymore

Scenarios for the next wave in end-user computing

BY DAVID FREELAND

Had we planned better, support for personal computers might well have been incorporated into the services provided by mainframe data processing centers, and information centers might never have come to be.

Now there is a second chance to plan more carefully, as recent major advances provide a fresh set of possibilities. Will information centers survive this time around, or will they become history?

Three technological milestones have changed some of the most significant premises on which information centers were originally established:

1) Flexibility provided by currently available local-area network (LAN) technology.
2) Increasing flexibility and portability of data base technology.
3) Imminent availability of distributed processing software.

These advances are altering the way information centers do business in the following ways:

- PCs are no longer stand-alone devices but are becoming nodes of microcomputer networks or a more complex generation of host networks on which data bases and processing are (truly) distributed.
- In this new environment, PC operators are no longer "little" DP managers but are becoming "remote" workstation managers.
- PC data files are not owned by the workstation user but, because of the microcomputer or host network, are becoming a company resource that needs to be centrally managed.
- PC hardware must be compatible with the company networking technology and devices used within an organization, suggesting an increase in importance of a single, under-one-roof management of all computer equipment acquisitions.
- PC operating systems must be compatible with the selected networking technology and devices used, putting new importance on centralized management of operating systems, versions and defaults.
- PC hardware — and users of that hardware — will be held responsible if they cause the rest of the network to become unavailable, stimulating new urgency for centralized management of hardware maintenance.

Changing world

In short, just about the only thing not changing is that PC applications can still be individually selected without major significance as to the remainder of the networking scheme.

This is true as long as the applications used can produce and receive required files in the necessary format for other network users. Even this area, however, will require more centralized control in networked

---

Freeman is project leader for special projects in the information services division at the Home Federal Savings & Loan Association in San Diego and a former data center consultant with Price Waterhouse.

P. CHARLES LADOUCEUR

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applications and distributed processing.

The impact of these changes will vary, but the direction will certainly be toward more of an assembly-line approach to PC support. Central DP organizations will push into information center turf, and following this intrusion will be a change in the nature of personal computing. The following scenarios are not farfetched:

- Company policy states that all PCs have at least one host connect. All PC files are backed up to the host via host control between 10 p.m. and 6 a.m. daily. The host may control and record PC access as well as internal file access and use or else the PC will not be able to access any network devices such as file servers and printers. The host maintains statistics and the current status of all PCs so that host operators know before the user does when hardware problems develop.

PC OPERATORS are no longer "little" DP managers but are becoming "remote" workstation managers.

- Host and host operators use every PC on the system to achieve the cheapest and fastest processing and file storage. Users may not turn off their equipment at the end of the day, because they may not be aware of who in the system might (remotely) be using their device or devices.
- Most mundane communications are done among PC and host terminal users using the workstation, including electronic document file exchanges, simple messaging and distribution-list types of mailings.

In general, new workstation requests will be handled in a production-line manner, because those workstations will be part of an overall system. The organization will continually explain to users that it doesn't matter what is available on the market; the company information system works only with authorized equipment that offers compatibility with the big systems family of microcomputers, minicomputers and mainframes processing companywide data — and that one user needs only a small slice of this total systems pie.

Job modification

A different set of jobs is always required for a different set of needs. In this case, there will be fewer programmers because programming will be easier and will require less. There will be more analysts because, since a greater potential exists to give everyone what they need, there is a greater need to understand what everyone requires. Some of the job changes and new types of jobs that will be created are listed below.

Connect systems specialist. Field-service technicians, currently trained in nonintelligent terminal servicing, will need to gain a working knowledge of the corporate LAN technology, emulation scheme, networking scheme and other PC expansion activity.

These connected systems specialists will also need to possess an operational understanding of PC operating systems, operating system alterations for networking, operating systems alterations for emulations, networking software, emulation software and, possibly, architecture conventions used. A broad understanding of PC file formats may also be a prerequisite for this position, as required for file transfers.

These specialists will also need to understand things like BIOS, virtual storage (both on the PC and the host), PC data security and encryption as well as managing electronic mail and

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The scope of the critical knowledge base in hardware and operating software required of this person is vast. Therefore, extensive understanding of PC applications software will probably not be important, which creates a need for a separate position, a "PC product specialist."

PC product specialist. This person will be an operational expert in PC-level application software used by the firm. Depending on the size of the firm, whether there is a separate architecture group and the extent of departmental processing software used, this position may also evaluate new software for use by the firm and may also maintain application software on departmental processors.

It is unlikely that this position would become involved with programming, however, since enough of a market presence exists in usable packaged software. Also, a larger DP organization requiring PC programming would probably have a separate programming area for custom PC software that would include a PC-to-host capability.

Distributed processing analyst. In the connected and distributed environment, processing should be accomplished at the lowest level possible, consistent with the need for multiple users and interfaces with other processes. This saves money because the cheapest processing is available at lower levels, making more expensive high-CPU-level processing available for needs that are more widely distributed throughout the company.

It will become increasingly possible to move processing (or parts of processing) around, but someone needs to keep track of where processing for all of the users is needed. For example, if a wholesaling firm's central office only needs a roll-up of remote warehouses inventory, it would be better to process (if possible) the inventory programs at the warehouse and communicate totals rather than try to run inventory programs off a mainframe at the central office for simultaneous access by all warehouses.

> THE IMPACT of these changes will vary, but the direction will certainly be toward more of an assembly-line approach to PC support.

The distributed processing analyst will review and monitor such needs, provide users with an understanding of what potential DP capabilities are available to them at the particular organization and may also perform traditional systems analysis work.

Distributed data base analyst. The distributed data base analyst may be the same person as the distributed processing analyst, or this may be a separate position. This person has the responsibility to identify the data needs of each user or group of users and to determine where the data would best reside. It would usually be desirable to have the data kept at as high a level as required in order to provide necessary access for others.

This person will also monitor data use to ensure that company data is kept secret and is backed up regularly and will inform users of available data so they will know of all possible opportunities for data manipulation.

Support by any name

The positions described above are different enough from mainstream DP jobs for some DP centers to maintain a separate workstation-, user- and distributed system-support unit — be it called an "information center" or not.

In other organizations, however, these duties will be accomplished by individuals in multiple organizational units, perhaps one type in the technical services group and others in production service areas.

In many ways, the deciding factor will be how the information center manager and staff position themselves during and prior to the transition stage. Careful planning during this time may save the information center. Lack of a strategy may make it history. ●

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TAKING CHARGE

David Ludlum

No dog days for MIS

With the Eastern Seaboard sweltering and news on the MIS front largely slowing to a seasonal trickle, one current of that flow seems to be at least holding steady — American corporations' exploitation of information technology to buoy mature businesses and plunge into new ones.

While the movement to strategic use of information resources has been subject to some hyperbole, recent events suggest the trend continues unabated and may be gaining momentum, with companies already accomplished in the field pushing further ahead.

One case in point is McKesson Corp. in San Francisco, an acknowledged leader in the strategic application of computer and communications technology, chiefly for the Economost on-line order-entry system used by retailers who peddle the drug store merchandise the company distributes.

At McKesson's annual meeting last month, President and Chief Executive Officer Thomas W. Field Jr. said the company may more than double its investment in computer technology and new facilities during the next five years.

The $700 million plan focuses on construction in Arizona of

Continued on page 74

Fleet installs CIO

Exec has been honored for strategic MIS

BY DAVID A. LUDLUM
CW STAFF

PROVIDENCE, R.I. — Fleet Financial Group, Inc. recently created the position of executive vice-president and chief information officer and filled it by hiring Michael R. Zucchini, who was honored this year for developing a customer information system at General Re Corp.

Zucchini, 40, started work at Fleet Aug. 3, taking charge of all data processing for the group's operations, including credit card processing and overall supervision of two units that provide DP services.

He arrived at Fleet 11 months before the company expects to complete a $1.3 billion merger with Norstar Bancorp, Inc. in Albany, N.Y., which would be one of the largest U.S. bank mergers. Fleet said it expects to complete the deal July 1, 1988, when a new Rhode Island banking law takes effect.

In a research report on 64 bank holding companies covering the first quarter of this year, brokerage firm Smith Barney, Harris Upham & Co. named Fleet the best overall performer. Its merger with Norstar would unite two strong regional banks that offer an array of nonbanking financial and DP services.

Zucchini comes to Fleet from serving as president and chief executive officer of General Re Services Corp., an information services subsidiary of General Re Corp., a reinsurance firm based in Stamford, Conn.

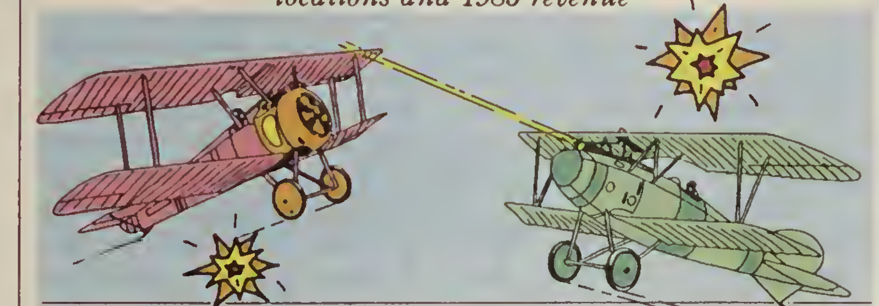
In May, Zucchini was one of five MIS executives presented with an award for achievement in managing information technology by sponsors American

Continued on page 74

Data View

Data dogfight

Airline reservation systems' shares of 1986 U.S. travel agency locations and 1985 revenue



Airlines	*Locations*	*Revenue*
American Airlines (Sabre)	36%	44%
United Airlines (Apollo)	25%	29%
Eastern Airlines/Continental Airlines (System One)	16%	11%
TWA/Northwest Airlines (PARS)	12%	11%
Delta Air Lines (Datas II)	11%	4%

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CW CHART: MITCHELL J. HAYES

Touch screens can ease users' keyboard phobia

BY ROSEMARY HAMILTON
CW STAFF

Worker resistance to computers remains a major issue for factory managers, but some have recently found that touch-screen technology is effective in combating this problem.

"Touch screens have been around for a long time, but they are really only now emerging in factories," says William McSpadden, who follows computer-integrated manufacturing for the the Gartner Group, Inc.

Many factory workers avoid using personal computers on the floor because they are intimidated by them, managers report. But touch-screen products provide an environment of which users are more accepting.

JOE PASTOREK/GAMMA LIAISON

Interactive Images' *Easel software*

"We've run into several problems with people being afraid of PCs. The keyboard is intimidating, and they are afraid they'll mess something up," says Frank Caldwell, a systems project manager at Ranco Controls North America in Plain City, Ohio.

Earlier this year, Caldwell's facility installed Easel software from Interactive Images, Inc. in Woburn, Mass. As a front-end to mainframe data bases, it allows workers to access the data from a PC with a touch-screen format. Easel is icon-based, providing and inputing data such as inventory figures when users touch a graphic representation.

'Kind of unique'

"It's kind of unique," the Gartner Group's McSpadden says. "There really aren't any competitors doing this exact kind of thing."

Caldwell says the product has helped his facility give factory workers more responsibility. "We're trying to push authority and accountability as far down the chain of command as possible," he says.

"People on the shop floor are the ones confronted by the dynamics of manufacturing. They have to make immediate decisions — often the wrong ones if they don't have the data on the floor."

John Allen, a supervisor at Ranco who uses Easel to track the production of power elements, says it is hard to make a mistake using the product. "It's very simple," he says. "You just reach up and push the screen."

Chrysler Corp.'s Sterling Heights, Mich., assembly plant is also installing Easel.

George Knapp, the plant's manufacturing systems manager, says workers find it almost self-explanatory. "There is so little training time," he says. "You can pick it up in a couple of seconds."

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Fleet CIO

FROM PAGE 73

Management Systems, Inc. and Carnegie-Mellon University's Graduate School of Industrial Administration [CW, June 1].

Zucchini was cited for developing the Communications Network for Electronic Reinsurance, which provides General Re's 300 underwriters and sales agents access to all company records on a customer or a prospective customer. The system tells users whether General Re has insured a prospect and generates documents and reports on coverage, quotations and documents for new policies and accounting entries.

Describing his experience at General Re as "absolutely wonderful," Zucchini said the new position poses the challenge of addressing a variety of complex DP needs, from the mundane to the strategic.

Ordinary building blocks

"Mundane applications should in no way be considered inferior," he noted. "I don't believe you can build a strategic system without having the foundation of the basic systems. Most companies don't realize it's a building block process." Those basic systems "have to have a substantial amount of quality."

Zucchini identified his four major tasks, in order of importance, as the following:

- Making sure each Fleet operation has a viable DP system.
- Taking advantage of areas of synergy among them.
- Developing appropriate, long-term, technology-based strategic plans.
- Generating fees from marketing DP services.

He said he would take advantage of the best applications available from Fleet and Norstar and from packages available on the market. "Both of these companies have grown through acquisition," he said. "The major challenge is to find the best approach and standardize as much as possible.

Fleet's Zucchini

"It's also very important to establish a direction in technology," Zucchini said. "The technology decisions are very important. A mistake could be quite costly."

Zucchini oversees Fleet Information, Inc. in Providence, which provides DP services to Fleet companies and services such as payroll processing to outside clients. David Sheppard continues to serve as president of Fleet Information, reporting to Zucchini.

Zucchini also supervises FAS, Inc. in Madison, Conn., which provides processing for variable and universal life insurance to underwriters.

Fleet, with assets of $11.7 billion and 490 offices in 39 states, has banking operations in Rhode Island, Connecticut, Maine and Massachusetts. Norstar has assets of $11.1 billion and 375 offices, with banks in New York and Maine.

Combined as Fleet/Norstar Financial Group, the two firms would form one of the 25 largest banking companies in the U.S. and one of the major new "super-regional" banks. Zucchini, one of six executive vice-presidents now at Fleet, said he would retain his present titles after the merger.

Zucchini was a member of President Reagan's Private Sector Survey on Cost Control, also known as the Grace Commission, which examined the operations of the federal government. He holds a patent for the invention last year of an outlet that can make mainframe computer terminals portable. He received an undergraduate degree in business and an MBA from Pace University.

No dog days

FROM PAGE 73

"the first of a new generation of hub distribution centers," which would serve seven states with computer technology and satellite communications. The strategy is to meet the needs of a customer base of high-volume but heterogeneous retailers.

Committed to the future

Field emphasized that the project would proceed only with the understanding that it would boost customer service, company growth, profits and return on investment.

If it succeeds, he said, "we will have leapfrogged our competitors just as we did a decade ago when we introduced Economost. Companies that are unwilling or unable to to make a similar commitment to the future will find it increasingly difficult to remain competitive."

Another company established in the competitive use of information technology that is expanding its efforts is Fleet Financial Group in Providence, R.I., an unusually profitable regional bank holding company with subsidiaries offering data processing services to insurers and other lenders.

Fleet has established the position of chief information officer at the level of executive vice-president and this month hired a highly regarded insurance executive to marshall its DP efforts (see story p. 73).

In another instance, Weyerhaeuser Corp., the Tacoma, Wash., forest products giant, is continuing its push into information products and services catalyzed last year with the creation of Weyerhaeuser Information Systems. In conjunction with offerings in software, computer services, training, disaster recovery and consulting, the unit's Manufacturing Systems Division said last month it will hold a June 1988 conference on linking incongruous computer systems.

The gathering will feature a computer model demonstrating how process industries can use the Manufacturing Automation Protocol/Technical and Office Protocol (MAP/TOP) data communications standards. A Weyerhaeuser spokesman notes that solutions to such technical problems free managers to address business issues.

Getting in on the act

Companies less frequently associated with information products and services are also stepping up efforts.

Last week, Bank of America National Trust & Savings Association in San Franciso, with Euromoney Publications PLC in London, announced a joint venture to capture and distribute the bank's extensive data on overseas economic trends. Bank of America-Euromoney World Information Services, which is scheduled to start up Oct. 1, will rely on a system designed by the partners that maintains a data base and generates products with personal computers and spreadsheets linked to a mainframe.

A chief selling point is the system's ease of use for the strategic planners the information is aimed at.

In another joint venture announced this month, Westinghouse Electric Corp. in Pittsburgh will provide training and consulting to users of Relational Technology, Inc.'s Ingres distributed SQL relational data base system. A Westinghouse spokesman says the joint venture will let the company apply to a broader market the skills it has developed in designing electrical generating plants over the years.

While investments in innovative uses of computer technology should be regarded with healthy skepticism, managers should be mindful of such moves being made by their competitors or future competitors — even in the dog days of summer.

Ludlum is *Computerworld's* senior editor, management.

CALENDAR

AUG. 30-SEPT. 5

The National Conference on Network Publishing. Dallas, Aug. 31-Sept. 2 — Contact: Interactive Features, Inc., 28½ Cornelia St., New York, N.Y. 10014.

Show CASE Conference II. St. Louis, Sept. 1-2 — Contact: Donna Skaggs, Center for the Study of Data Processing, Campus Box 1141, Washington University, One Brookings Drive, St. Louis, Mo. 63130.

Computer Aided Publishing CAP'87 West. Los Angeles, Sept. 1-3 — Contact: Computer Aided Publishing CAP, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

5th Anniversary PC Expo. New York, Sept. 1-3 — Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Thirteenth International Conference on Very Large Data Bases. Brighton, England, Sept. 1-4 — Contact: VLDB 87, The Conference Department, British Computer Society, 13 Mansfield St., London, UK W1M 0BP.

SEPT. 6-12

Banque '87 — The 6th European Trade Fair for Techniques and Organization in Banking. Copenhagen, Sept. 7-9 — Contact: Bella Center A/S, Center Blvd., 2300 Kobenhavn S, Denmark.

SIBOS: SWIFT's International Banking Operations Seminar. Montreal, Sept. 7-11 — Contact: Euan R. Sellar, Public Relations Department, Society for Worldwide Interbank Financial Telecommunication S.C., Ave. Ernest Solvay 81, B-1310 La Hulpe, Belgium.

12th Annual National FSI User Conference. Dallas, Sept. 8-11 — Contact: Forum '87, Elizabeth Joyce, Suite 700, 2777 Stemmons Freeway, Dallas, Texas 75207.

Decworld '87. Boston, Sept. 8-18 — Contact: Public Relations Department, Digital Equipment Corp., 200 Baker Ave., Concord, Mass. 01742.

OSI Meeting for Government Users. Gaithersburg, Md., Sept. 9-10 — Contact: Joan Wywra, Room B218, Building 325, National Bureau of Standards, Gaithersburg, Md. 20899.

Financial Investment Management Exposition and Conference. New York, Sept. 9-10 — Contact: FIM Conference, Flagg Management, Inc., P.O. Box 4440, New York, N.Y. 10163.

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: Jackie Voigt, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

The Desktop Publishing Conference. Santa Clara, Calif., Sept. 9-12 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

Distribution/Computer Fall Expo '87. New Brunswick, N.J., Sept. 10-11 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

SEPT. 13-19

Vaulting the Barriers to EFT Success. Washington, D.C., Sept. 13-15 — Contact: Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

13th National Conference of North American Honeywell Users. Cincinnati, Sept. 13-17 — Contact: Les Pacca, NAHU, P.O. Box 2037, Willingboro, N.J. 08046.

Software Contracts. Boston, Sept. 14-15 — Contact: Registrar, Batelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105. Also being held Oct. 5-6 in Chicago.

The First Annual Conference on Expert Sytems in Financial Institutions. New York, Sept. 14-15 — Contact: Institute for International Research, Inc., Suite 600, 9301 Wilshire Blvd., Beverly Hills, Calif. 90210

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

Data Storage 87. Santa Clara, Calif., Sept. 14-16 — Contact: Forum Management, Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

7th Annual Conference on Control, Audit & Security of

IBM Systems. Chicago, Sept. 14-17 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Integrated Manufacturing Solutions '87. Long Beach, Calif., Sept. 14-18 — Contact: Intertec Communications, Inc., Building 33-34, 2472 Eastman Ave., Ventura, Calif. 93003.

1987 Electronic Printer and Publishing Conference. Miami, Sept. 14-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

ICCC-ISDN '87 . . . Evolving to ISDN in North America. Dallas, Sept. 15-17 — Contact: International Council for Computer Communication, c/o Bell Communications Research Corp., Room 1B349, 290 W. Mount Pleasant Ave., Livingston, N.J. 07039.

CAM-I Industrial Automation Standards Conference & Workshop. Chicago, Sept. 15-18 — Contact: Annette Van Hauen, Computer Aided Manufacturing-International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

The National Association of Bank Servicers' Annual Meeting. Seattle, Sept. 15-18 — Contact: NABS, Suite B, 5008 Pine Creek Drive, Westerville, Ohio 43081.

Workshop on Computer-Assisted Map Analysis. Corvallis, Ore., Sept. 16-17 — Contact: School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511.

Information Systems Consultants Association's Second Annual Conference and Consultants Market. Atlanta, Sept. 18-19 — Contact: ISCA, Inc., P.O. Box 467190, Atlanta, Ga. 30346.

SEPT. 20-26

Interex North American Conference of Hewlett-Packard Co. Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Systems Integration in Multivendor Environments: Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Marina Pettijohn, Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Integrated Services Digital Networks. San Francisco, Sept. 21-22 — Contact: Customer Service, Frost & Sullivan, Inc. 106 Fulton St., New York, N.Y. 10038.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Fifth Annual NCR Users Eastern America Conference. Fort Washington, Pa., Sept. 24-25 — Contact: Frank Whalon, c/o Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

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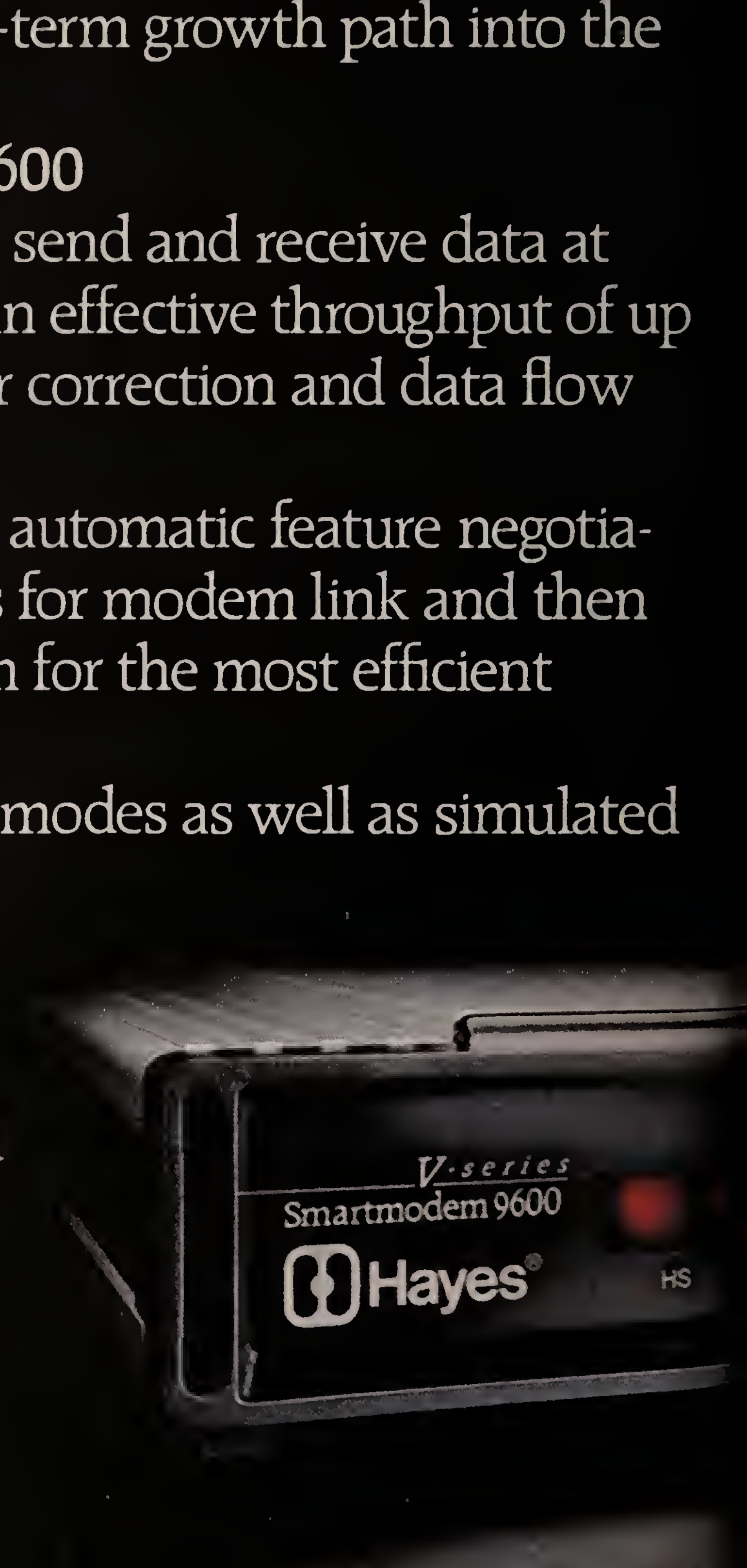

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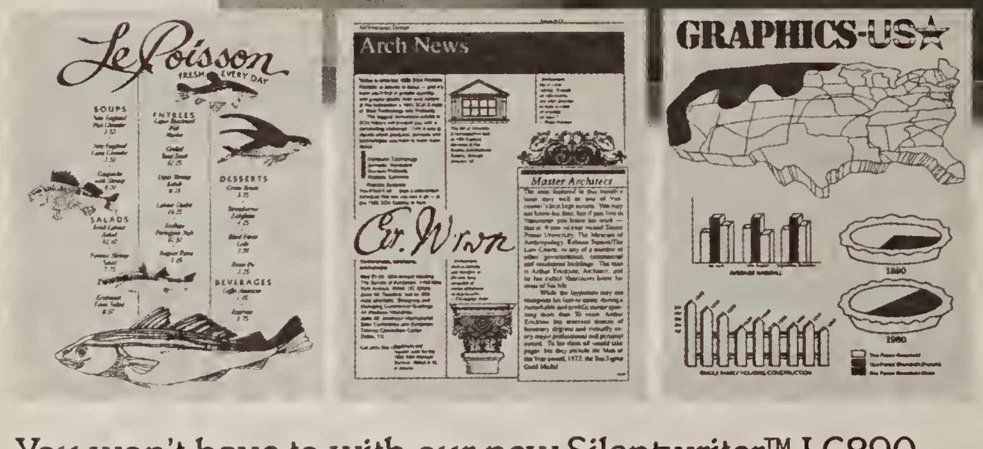

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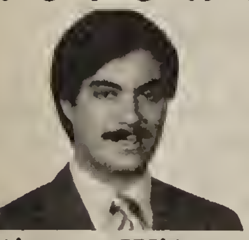

Clinton Wilder

Talking a lot, saying little

About a year ago, we published in this column a list of what we considered the top 10 computer industry cliches of 1986. In the midst of this summer's dog days, it is time to roll out the second annual edition.

1. We offer solutions. Variation: We are a solutions-driven company. This was No. 1 last year and has only solidified its position in the last 12 months. It seems no one in this business sells hardware, software or communications gear anymore, just "solutions." If the phrase means better integration of islands of automation within an organization, fine. But in all but the leanest MIS operations installing complete turnkey systems, it is MIS that provides the solutions; the vendors supply tools to assist that task.

2. We are committed to standards. Unix, Manufacturing Automation Protocol (MAP), SQL, Open Systems Interconnect (OSI). . . . Everybody says they're committed. If they were all truly behind standards, we wouldn't need the Corporation for Open Systems to push OSI, and we wouldn't have the MAP controversy rearing its head every other week.

3. We provide departmental systems for today's distributed environment of networked work group computing. Doesn't anyone make minicomputers anymore? (By the way, is a work group larger or smaller than a department?)

4. Our industry is consolidating, and this represents a great opportunity for us. In other words, we can't wait to swallow up a cash-starved competitor and increase our market share.

5. We offer much more value-added service, or product, and we don't compete on price alone. This one is voiced by the third-party market when a major vendor unexpectedly slashes prices on systems, software or maintenance. Granted, third-party maintenance pro-

Continued on page 80

Workstations hit financial target

Price cuts, graphics spark Sun, Apollo growth in brokerage market

BY ALAN ALPER
CW STAFF

NEW YORK — Technical workstation vendors are making significant inroads into the financial services industry, a market that only recently has become a primary target for their high-performance wares.

In the past year, leading banks and brokerage firms have adopted Unix-based technical workstations manufactured by Apollo Computer, Inc., Sun Microsystems, Inc. and IBM for a variety of applications. Uses range from securities trading and real-time market analysis to portfolio management and expert systems development.

Fueling the trend is the gradual price reduction in entry-level workstations from more than $10,000 to less than $5,000. At this price point, Unix-based technical workstations designed around the Motorola, Inc. 68000 line of microprocessors are providing more bang for the buck than high-end microcomputers based on Intel Corp. 80286 and 80386 microprocessors.

From a software perspective, technical workstation vendors have seized the opportunity to crack the financial services business while Microsoft Corp. MS-DOS-based micros still lack true multitasking capability. OS/2, Microsoft and IBM's multitasking operating system for the personal computer industry, is not expected to be available until early next year.

"People do not want to wait for OS/2 to be available," says William O'Neil, vice-president of technical planning at Shearson Lehman Brothers, Inc. "Many firms are looking at Apollo, Sun and even IBM's RT Personal Computer for that reason."

Both Apollo and Sun are in the process of opening sales and support offices in the world financial centers of Chicago, Los Angeles, London, New York and Tokyo. Both see increased penetration of the financial services market as vital to sustaining their accustomed heady growth rates.

"We looked at the sales and trading area and found that there was a market of 100,000 seats [users], growing at 10% to 15% annually," notes Bruce Golden, Sun's financial services marketing manager. "With trading floor technology turning over every three or four years, we felt you can never saturate the market. You can resell those seats."

Golden says that traders like information displayed graphically because it better reflects financial relationships. Multitasking is important, he adds, because of the traders' need to monitor a variety of markets simultaneously. Traders used to need eight to 10 monitors to track vital market information, but with a Sun workstation displaying multiple windows, mar-

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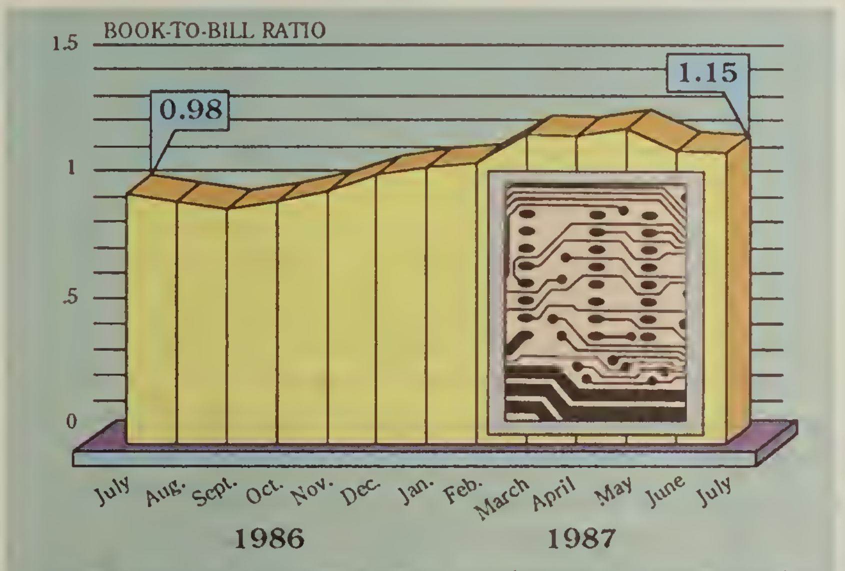
Data View

The chip industry rebound

*U.S. semiconductor industry's monthly book-to-bill ratio, 1986 to 1987**



* A book-to-bill ratio of 1.15 means that for every $100 worth of a product that is shipped (billed), manufacturers receive $115 worth of new orders (bookings). The ratio is computed by dividing three-month average bookings by three-month average billings

INFORMATION PROVIDED BY THE SEMICONDUCTOR INDUSTRY ASSOCIATION
CW CHART

Cincom eyes first public offering

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Cincom Systems, Inc. President and Chief Executive Officer Thomas Nies last week projected that the Cincinnati-based data base company will make its initial public offering in the next nine to 24 months.

"The timing is very appropriate for us now to seriously consider going public," said Nies, who was in Chicago to address a Cincom executive seminar. "We would like to raise $30 million to $50 million by allowing public ownership of a minority share in the company. We would like to use outside capital to expand our infrastructure and our distribution system."

The aim of the public investment in Cincom would be to spur the company toward its goal of $200 million a year or more in annual sales. The firm currently projects revenue of $115 million this year.

Cincom is the only major mainframe data base supplier that is still privately held.

However, Applied Data Research, Inc. is now a unit of Ameritech.

As part of his investment strategy, Nies said he plans to retain the role of president for a year or more, in part to reassure investors of the company's direction and stability. On Aug. 10, Nies reassumed the company's presidency after Dennis Yab-

Continued on page 80

Network General: sniffing out network snafus

BY ELISABETH HORWITT
CW STAFF

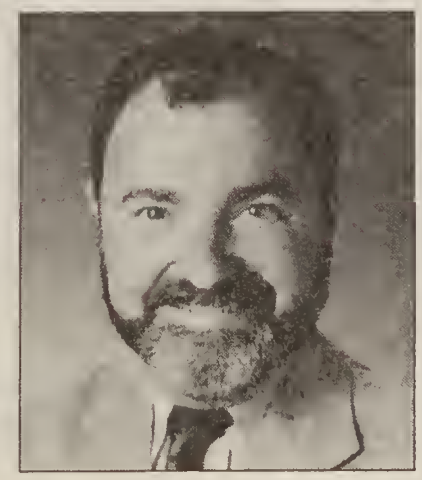
SUNNYVALE, Calif. — When he formed network diagnostic company Network General Corp. in 1985, Harry Saal brought with him two valuable lessons that he had learned at his former company, Nestar Systems, Inc.

The first lesson: Thou shalt not sell a technology before its time. The second lesson: Thou shalt not tie a networking product to a single set of protocols.

Mountain View, Calif.-based Nestar, founded by Saal in 1978, sold local-area networks (LAN) several years before their time, according to Saal. "It was an uphill battle," he says. "We were convinced the technology was right and the idea was good, but, being small, we couldn't wait 10 years for the 'Year of the LAN' to arrive."

When Nestar was clearly floundering, Saal looked around for an area of the LAN market in which there was growing demand but few products available. Two years ago, he found such an area — network diagnostics tools.

"We found at Nestar that one of the great problems of the network vendor is solving problems . . . when one vendor supplies the software, another the personal computers, a third the server and so on," Saal says.



Network General's Saal

"When networks work, they work great, but when they don't, it's [difficult] to find the problem because it is often something small, like one bad card or cable segment," he adds.

Enter Network General and its aptly named diagnostic product, Sniffer. The Sniffer monitors packets going over a network between a given PC and server, searching for existing and potential bottlenecks.

"It works like a CAT scan or X-ray, looking at packets and protocols going over the net, allowing you to see healthy and unhealthy activity," Saal says. "Either things are already at a level where you can make a major improvement by tuning the network, or there is incipient rot, which will cause problems if left unchecked."

With a $20,000 price tag, the

Continued on page 81

Cincom

FROM PAGE 79

lonsky's sudden resignation after a three-year tenure. Yablonsky left to become president and CEO of the Carnegie Group, Inc., a Pittsburgh-based artificial intelligence software firm [CW, Aug. 17].

Majority control of Cincom would remain firmly in the hands of Cincom's 1,400 employees, who have been granted stock options since 1981. "We would not provide majority control outside the company because of the short-term goals of the investment community," Nies cautioned.

Nies blasted investors that have broken up companies for short-term gains in recent years. "Giving those kinds of investors majority control would be letting events control your company's strategy, rather than letting you control events," he commented.

Nies said Cincom has spent $100 million on research and development costs since 1979, something that outside investors would never have allowed. Last year, R&D expenses topped out at 19% of Cincom's budget.

The firm first hinted at a public offering nearly three years ago but put the plans on hold when the mainframe software industry sagged.

Cincom, the first company to market a competitor to IBM's DB2 relational data base, has said it intends to capitalize on more than seven years of development in the Supra line.

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Larger power requirements of advanced satellites promise to be met by a new type of battery. Hughes Aircraft Company is developing nickel-hydrogen technology for the U.S. Air Force. The new batteries will be placed on larger spacecraft now being built for customers such as the Air Force, Japan Communications Satellite Company, and INTELSAT, the international telecommunications consortium. A nickel-hydrogen battery the same size and weight of a conventional nickel-cadmium battery will produce more watts for more years, take more abuse, and perform well even when nearly drained of power.

Hot spots, leaks, and other potential problems in jet engines show up more readily during testing with the use of a Probeye® thermal video system by the U.S. Air Force. Six units of an advanced, third-generation version of the system, developed by Hughes, have been delivered to Arnold Air Force Station in Tennessee for use in analyzing engines undergoing performance testing. Designed for both laboratory and field applications, the all-electric thermography system provides a real-time, multi-color television display of the temperature distribution of a scene being viewed by the Probeye infrared viewer. The new version features enhanced image processing capability, a four-fold improvement in resolution, easier portability and other operational improvements that provide the user with more information for quicker, more accurate testing.

An aircraft collision avoidance function is part of the new air traffic control system in the Republic of Korea. One of the world's most sophisticated civilian air traffic control (ATC) systems warns controllers when aircraft fly in converging paths, descend below a safe altitude, or approach restricted airspace. Radar data and flight processing functions are automated and combined in the system, enabling controllers to move traffic safely and expeditiously. The system monitors data simultaneously from multiple overlapping radar networks, creating a tracking picture significantly more reliable than current systems. When a potential conflict is identified, the system automatically provides an early visual and audio alert on the air traffic controller's console. Under development for three years, the ATC system and the aircraft collision avoidance function were both developed and built by Hughes. The system provides complete control of South Korean airspace, including en route and airport approach control throughout the nation and over ocean areas.

A ground-based sensor is being developed to reduce exposure to chemical weapons. The Hughes Remote Active Spectrometer (RAS), designed to detect chemical agents up to three miles away, will lessen the danger to forward observers and the larger community. Unlike conventional point detectors, the RAS is a standoff sensor, and does not require physical contact with contaminants to take readings. The unit beams carbon dioxide laser pulses at a specified target area. It then tells the RAS operator if contamination exists, and identifies the type, concentration, and location of the chemical. Studies are underway to adapt the RAS on U.S. Army reconnaissance vehicles and helicopters.

A broad spectrum of technologies, many of which grew up within the past five years, are represented in the products of Hughes' Industrial Electronics Group. Six divisions and two subsidiaries, each operated like a small high-tech company but backed by resources of its multibillion-dollar parent, offer career benefits to qualified engineers and scientists. Advancing technologies such as microwave and millimeter-wave communications, silicon and GaAs solid-state circuitry, fiber optics, and image processing equipment are pursued in facilities located in many of Southern California's most desirable coastal communities. Send your resume to A.T. Moyer, Hughes Industrial Electronics Group, Dept. S3, P.O. Box 2999, Torrance, CA 90509. EOE. U.S. citizenship may be required.

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Talking a lot

FROM PAGE 79

viders can offer customized services that users may find superior to IBM's. But their businesses never would have gotten off the ground without underpricing Big Blue, and cost savings are still their modi operandi.

6. It's a software-driven business now. Not untrue. If it weren't true, it wouldn't be a cliche, right?

7. We are focusing on vertical markets. Now *there's* a phrase that means many things to many people. To some vendors, "manufacturing" and "financial services" are vertical markets; to others, the buzzword refers to small companies making customized widgets for oil drilling rigs in the North Sea. There is nothing wrong with specialized marketing and product development, but "vertical" has degenerated into a word without a definition.

8. We are reorganizing to better serve and get closer to our customer. A blanket justification for layoffs, plant closings and reshuffling top executives to reward those who have done well and bury those who haven't. This one really means, "We know that what we've done so far hasn't worked, so we'll try something else."

9. Our departing chairman/president/chief executive officer will remain with the company on a consultant basis to identify new business opportunities. This one is for the top executive changes running rampant in the industry lately. It's usually an outright falsehood, unless the company considers it a new business opportunity to operate outplacement services for departing executives.

10. There is a pause in the market as users are assessing the impact of the IBM Personal System/2. Gee, a couple years ago, it was tax reform or the IBM 3090 or the strong dollar. Poor sales are never the vendor's fault; there is always an outside reason. But the proof is in the pudding of the competition. You don't see any "pause" at Compaq, Tandy, Apple or the micro software Big Three.

Wilder is *Computerworld's* senior editor, computer industry.

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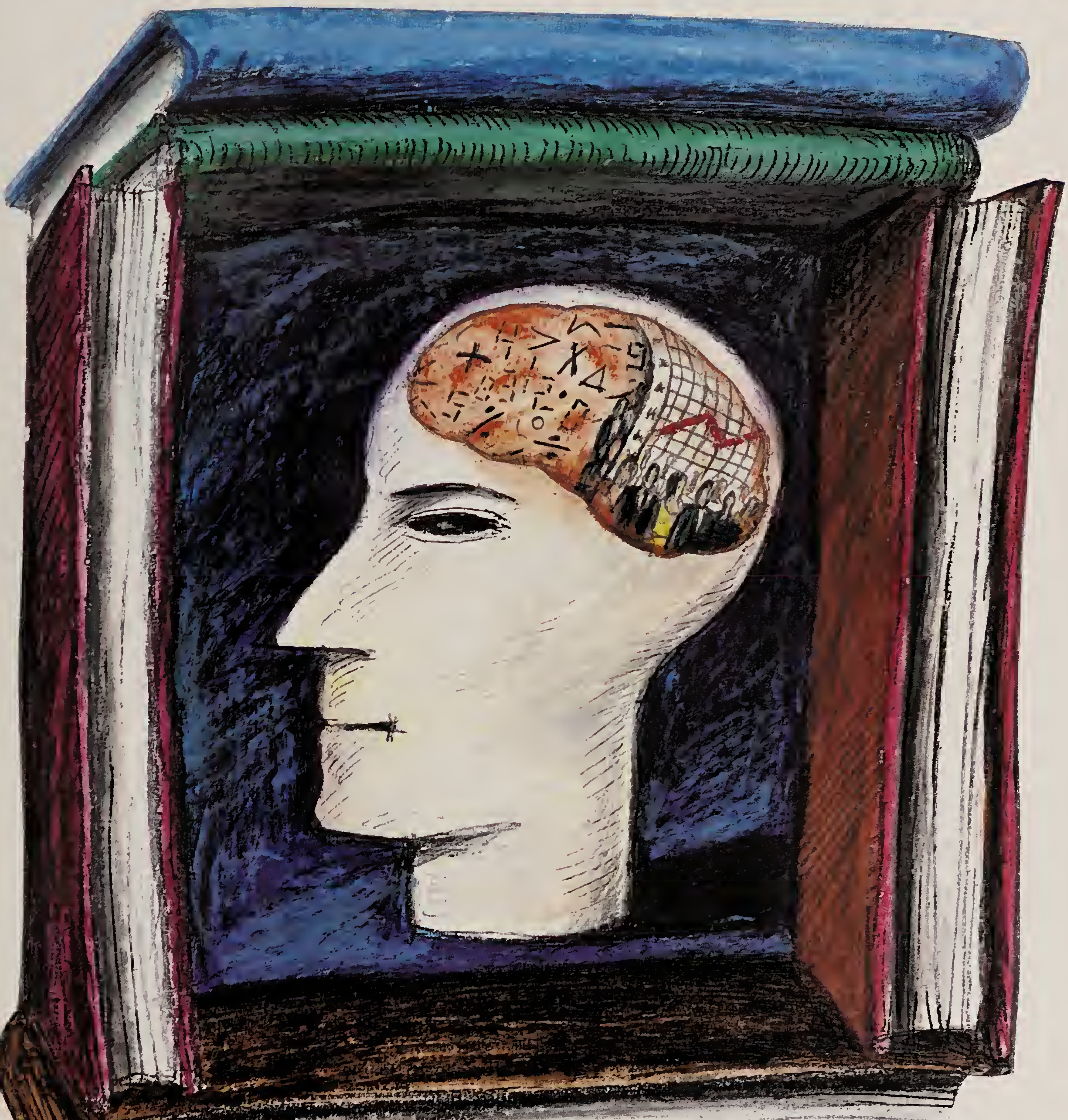

A well-rounded program for development of DP personnel includes continuing technical education as well as training to build proficiency in the "soft skills" of management.

AUGUST 24, 1987 • SPOTLIGHT NO. 19

Issues of the Information Age:

The way beyond Babel.

Imagine trying to build a railroad system if every locomotive manufacturer used a different track gauge. And each local stretch of railroad had a different load-carrying capacity and its own unique set of signals.

The business of moving and managing information is in a similar state today. Machines can't always talk to each other. Proprietary systems and networks abound. And the enormous potential of the Information Age is being dissipated by incompatibility.

The way beyond Babel lies in setting firm, far-reaching standards. In developing products and services that conform to those standards while establishing new standards for higher-level functions and applications.

The process must be continuous. Dynamic. And cooperative. We must share our visions, technical approaches and experiences. AT&T is committed to that course.

Our involvement in the evolution of ISDN (Integrated Services Digital Network) is a good example of this process at work.

AT&T works closely with national and international coordinating groups to establish standards through consensus and insure that they are consistently interpreted.

Where standards are firmly established, we've developed products and services that conform to them and address a broad range of customer needs. From voice/data work stations and ISDN PBXs for business to central office switches for Operating Telephone Companies.

Wherever possible, we've also shared the benefits of our experience, as we did in a recent Chicago test where, in partnership with Ameritech's Illinois Bell, AT&T began the nation's first customer application of a production ISDN system for McDonald's.

We must, as an industry, continue working together to provide our customers with maximum flexibility and utility. Then they can decide how and with whom to work.

Once we've taken those important steps, we foresee a time when the promise of the Information Age will be realized. A time when people will participate in a worldwide Telecommunity through a vast, global network of networks. A merging of communications and computers which will enable them to handle information in any form—conversation, data, images, text—as easily as they make a phone call today.

Telecommunity is our goal. Technology is our means.℠

We're committed to leading the way.

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INSIDE

Interview

Terry Ebert, director of training at Morgan Stanley, discusses his firm's three-pronged training strategy. Page S5.

Mixed Messages

A judicious blend of classroom training, CBT and video instruction offers the ideal training environment. Page S8.

The Transition

The road from "doer" to manager can be hard going, but there are ways to ease the transition. Page S9.

Obstacle Course

Know-it-all students, lack of corporate commitment and varying skill levels are just a few of the challenges technical trainers say they must deal with in the classroom. Page S10.

Teachers Who Can

Good classroom skills are just the beginning. The successful trainer must be flexible and imaginative and, above all, possess a strong business orientation. Page S16.

Product Charts

Detailed guides to suppliers of technical and management training for DP. Pages S11 and S14.

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Power is one reason to put business and management education into DP curriculum. Otherwise, generalists may grab control.

MASTERING MANAGEMENT

BY MICHAEL SULLIVAN-TRAINOR

PETER KUPER

To guarantee that the MIS department is more closely tied to business strategy, executives at Ralston Purina Co. in St. Louis are promoting nontechnical managers to senior DP positions. "The corporate executives don't have time to manage the department themselves, so the alternative is to get a person they trust — someone who will run information systems like the rest of the company. That person is usually a corporate non-DP staffer on a fast track who understands the business," says Curt McDermott, Ralston Purina's director of MIS operations and customer service, who himself gained his managerial experience through nontechnical positions.

Losing top management positions within their own departments to business-oriented peers is one of the key factors driving MIS managers to seek specialized management training and education. "There is definitely a trend to transfer proven managers into information systems groups," says J. Daniel Cougar, professor of computer and management science at the University of Colorado. "Obviously, the reason is we have not prepared our technical people well enough to do a good job in management. In those companies where this is happening, the executives are really saying that managerial ability is more important than technical ability."

Other trends stirring companies to establish MIS management training programs outside the human resources department include the following:

- **Business demands.** As corporate executives become aware of the competitive advantages provided by information resources, they are relying more heavily on MIS to apply systems to serve business strategy.
- **High turnover.** Companies are recognizing that high employee turnover within MIS is partly attributable to poorly trained managers.
- **Recognition.** While many managers try to establish dual career paths — providing unlimited growth on the technical as well as the management side — becoming a manager is often the only viable path to promotion for technical workers.

Though research in the late 1970s identified the need to provide MIS/DP professionals with unique management and business training, many companies are only now instituting independent programs to shepherd people through the transition from technician to manager.

For example, Allstate Insurance Co. in Hartford, Conn., is only now finding out the hard way that technical people find it difficult to act as managers without specialized training. More than 50 DP consultants at Allstate work as project leaders and liaisons between the information systems group and end users. Promoted for their technical prowess, they received no management training for their particular needs.

"Directors who have consultants reporting to them are receiving negative feedback," says Pat Lucas, Allstate's manager of technical training. "They've gone on walk-throughs and found that the consultants don't know how to talk to users."

Within a year, Lucas expects to implement a DP management training program to provide consultants with interpersonal and management

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Sullivan-Trainor is a *Computerworld* senior writer.

Management

FROM PREVIOUS PAGE

skills. "Our corporate management development training does not address DP needs," she says. "DP professionals need more communications skills training because they are used to working with machines, not people."

Many companies currently concentrate their efforts on training technical people who are already struggling in management positions rather than teach new candidates management skills.

"Most often, the recipients of this training are guys who have been in management jobs for six months to a year," Cougar says. "There is a strong backlog of existing managers out there who get priority over the people being groomed for management. Many of the current managers are people with a lot of technical background but without the proper education. The backlog stems from the fact that we are still giving most of the budget priority to technical training."

Rapid changes in technology are causing companies to emphasize technical training, and many managers still view management training as "a nice extra," Cougar says.

"Managers can still manage without training," he adds. "So the training is often viewed as icing on the cake."

Ralston Purina's MIS managers — whether they possess a technical background or not — can take technical courses from outside vendors. But until recently, they were not exposed to management training within the MIS department. McDermott is trying to provide management training for his 200-person technical staff at the company's St. Louis data center.

"For the past two years, the emphasis has been on nontechnical training," McDermott says. "We've used American Management Association courses, computer-based training and video tapes of management consultant Tom Peters. We're trying every technique we can.

"I'm trying to expose people to management and business skills. There's a lack of management perspective among the DP people. I'm trying to change the mindset," he says.

Different cultures

Moving technical staff members into management positions requires providing them with the skills to work in a different culture. First, the technician must be convinced that it is worth his time to learn them.

> "THERE'S a lack of management perspective among the DP people. I'm trying to change the mindset."
>
> CURT MCDERMOTT
> RALSTON PURINA CO.

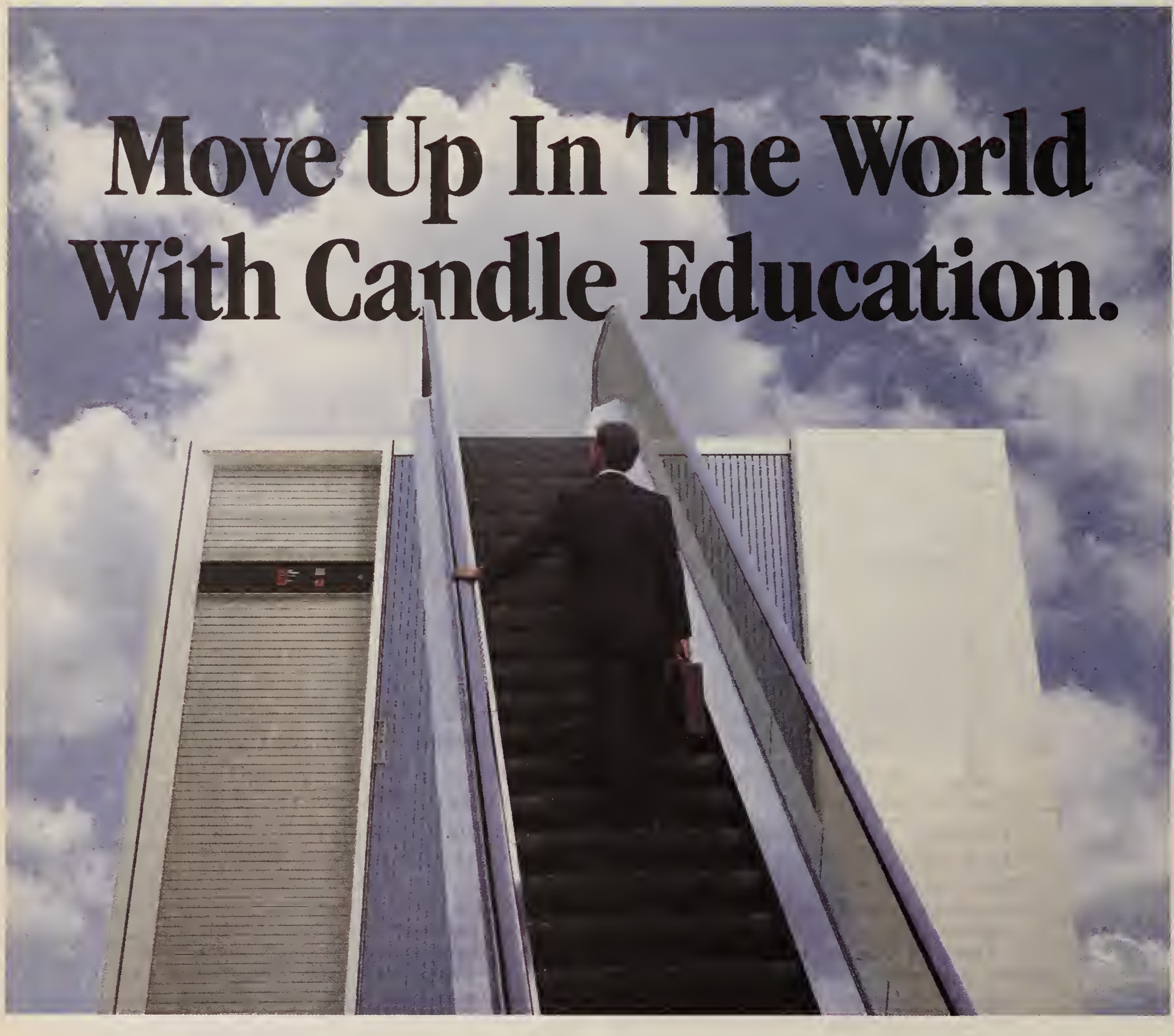
"Technical people tend to think of management skills as something you can learn when things quiet down, not as a way to handle yourself every day," says independent consultant Rosalind Gold. "They need to learn that when you are responsible for getting a lot of talented people to work toward a common goal, management skills are essential."

While first-line supervisors and project leaders need training in project management, delegation and communication skills, senior managers require more complex training.

"They need to learn a lot about company politics," Gold says. "As you get higher in the organization, political considerations are a key factor in your success. A lot of decisions are made that sound like technical compromises. Sometimes, of course, they are.

"For technical people who are well versed in their specialty, politics seems to contaminate the purity of the speciality. Technical people need to see the process as a way to make their work available to others rather than as harmful to the technical solution," she says.

Beyond adapting to cultural differences, technical people must switch their loyalties, says consultant DeAnne Rosenberg,



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a management trainer since 1971. "Often, a technical person's loyalty is targeted more at the excitement of solving technical problems than at meeting the company's needs," Rosenberg says. "Managers have to be loyal to the company."

Reaping new rewards

For most managers, transferring loyalty means finding different rewards in their work from when they were technicians. For example, Steve Folick, an information systems supervisor at Lockheed-California Co. in Burbank, Calif., found different ways to obtain satisfaction when he was promoted from the programming ranks to a management post.

"There are different things that motivate you as a manager," Folick says. "As a programmer, my immediate gratification came from writing a piece of code and seeing it work. If your reward system is on that level, then it is difficult to make a transition to a level where your rewards are from the good work that others do.

"A lot of times, as a manager, if you write a good business letter, you feel good about that. You gain feedback from different kinds of activities. Although every once in a while, I like to go back and write some code," he says.

Using a national data base of 8,000 DP professionals, Cougar and Robert Zawacki, professor of management and organizational behavior at the University of Colorado, compared survey results on motivation and management of technical professionals with those of 500 other occupations.

The research they conducted reveals that DPers have a greater need for growth than any other occupation surveyed.

The DP staffer's strong desire to take on ever greater challenges makes him an ideal candidate for fast-track management positions, Cougar says. But the technical bias of many DP professionals prevents them from seeing management as a viable growth path.

"They need a lot of challenge in their jobs," Cougar says. "But technicians feel they'll lose their technical capability if they become managers. They need external motivation that promises the management job can be just as challenging. This idea has to be made more explicit in management courses."

Social wallflowers

Cougar and Zawacki also found that DP professionals have the lowest need for social interaction of all the occupations surveyed. Based on this finding, Cougar contends that management courses for technical people should contain a strong dose of small-group dynamics.

Managers must, by the nature of their job, increase their level of interaction over that of independent technical roles. But there is some debate among MIS managers and consultants about whether an emphasis on technical skills is a hindrance or an asset to a manager of a technical staff.

On one side of the issue are those who say that nontechnical managers often find it difficult to gain respect from their technical staffs.

"A pure manager cannot manage a technical staff well," says Paul Bangert, assistant vice-president of data processing for Bank One, Indianapolis, NA. "You have to have some good basic background in what your people are doing. A nontechnical manager cannot appreciate the problems his staff faces, and that causes a real decay in morale among the technical people."

> "A NONTECHNICAL manager cannot appreciate the problems his staff faces, and that causes a real decay in morale among the technical people."
>
> PAUL BANGERT
> BANK ONE, INDIANAPOLIS, NA

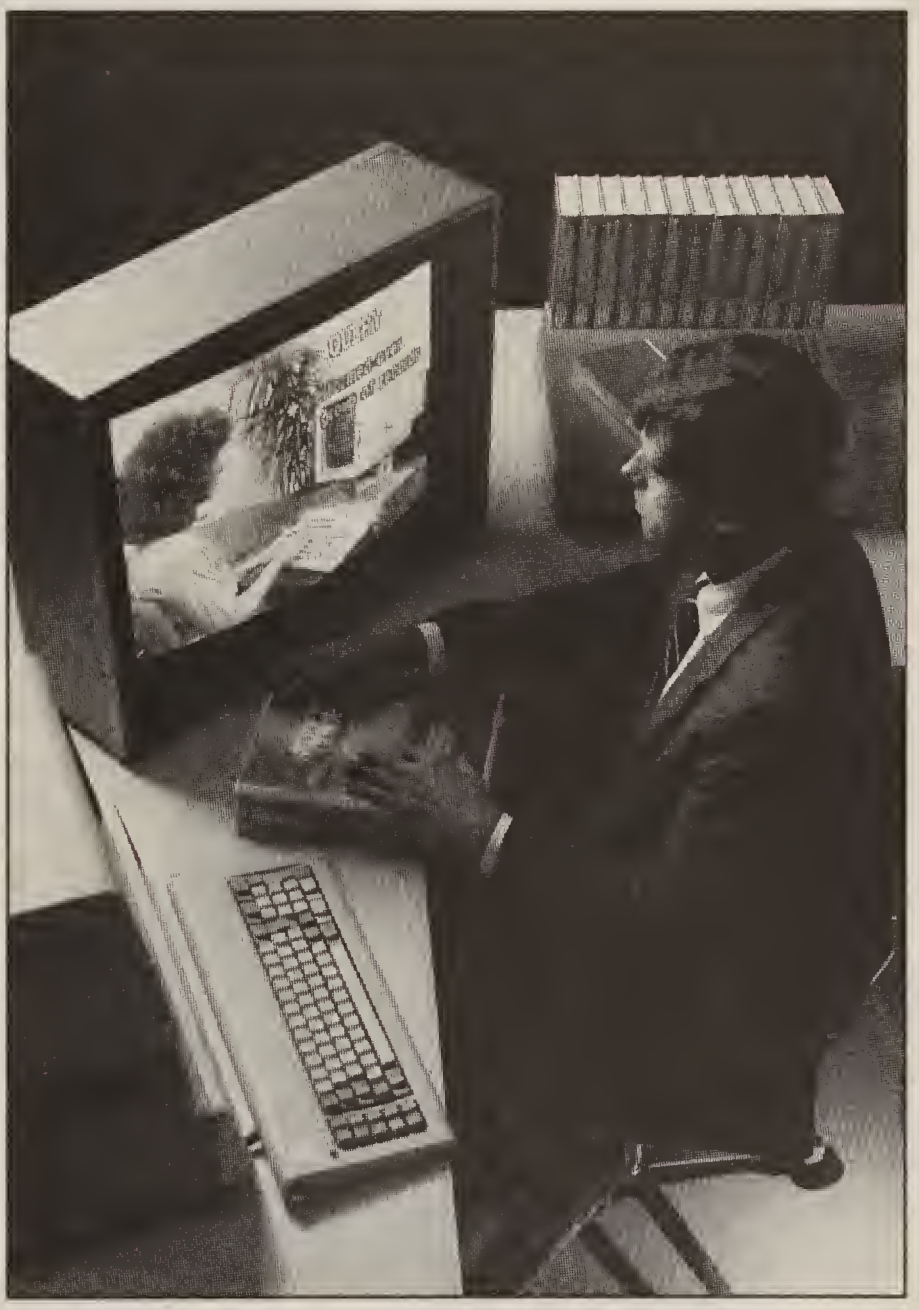
On the other side is Jim Bigham, vice-president of operations for Prudential-Bache Securities, Inc. in New York.

"A good manager can manage a technical organization or a nontechnical one, regardless of his background, because he is using the skills of the people around him," he says. "Nontechnical managers can effectively manage technical departments because their objective is not to be technicians but to be providers of the business guidelines and controls."

Whether companies emphasize the technical or the managerial side often depends on their long-term strategy, says Curtis Plott, executive vice-president of the American Society for Training and Development in Alexandria, Va.

"The type of training the training department will provide has to do with how it aligns itself with the company's business objectives," Plott says. "If the company is trying to change the culture or the business strategy within the organization, training will focus on management development. On the other hand, if the company is cutting costs or has identified technology as the key to the future, there will be a lot more technical training."

For example, at Lockheed, technical skills are vital to the company's sophisticated military aircraft manufacturing business, and MIS professionals within



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the organization are currently more concerned with the technical knowledge and capabilities of their managers than with their managerial skills.

"Over the last couple of years, we have recognized that we need to help our management understand the technical aspects of the organization," says Merv Dirks, information management specialist.

Because a large portion of Lockheed's population includes engineers, the company's management training is geared to technical professionals, eliminating the need for a separate MIS management program. Companies with fewer technical employees, such as those in the finance and insurance industries, tend to offer more customized management training for MIS professionals.

> HOW RECEPTIVE are MIS managers to management training programs? Initially, they make the transition "kicking and screaming."
>
> BILL ANDERSON
> PRUDENTIAL-BACHE SECURITIES, INC.

"Everyone is trying to use technology smarter," says Sandra Ginnis, director of DP education and development at Travelers Insurance Co. in Hartford, Conn. "In a service industry like ours, technology gives you an edge, and it requires you to look at your personnel and figure out ways they can be more effective."

Until recently, Ginnis's department conducted only technical training. Now, because of new business objectives, the department will offer management training next year.

Courses cover only 20% of what DP professionals need to know to become managers, Ginnis says. The other 80% of their management knowledge should be provided by on-the-job experience, including formal job rotation, mentoring and succession planning programs.

The Travelers' version of job rotation would include identifying the skills a technical person needs to acquire and determining which on-the-job experiences provided exposure to those skills. The length of time in the different jobs would range from six to 18 months and could include exposure to both technical and management skills.

Ideally, the candidates for job rotation would take courses to prepare for rotation, move to jobs at their own levels and once they acquired the necessary on-the-job skills and coursework for the next level, be promoted.

Another possibility Ginnis is considering would be to send DP staff members to courses covering the areas of the business they support. For the program to work, Ginnis's department must coordinate its efforts with the DP supervisors.

"We don't have the staff to do all the evaluations for individual development plans," she says. "I envision a partnership with various line supervisors to identify the skills needed. The managers would functionally develop the individual plans, and we would become a delivery system."

Managers from Missouri

How receptive are MIS managers to management training programs such as the Travelers'?

Initially, managers make the transition "kicking and screaming," says Bill Anderson, director of Prudential-Bache's Information Systems Division. Two years ago, Anderson introduced a full management education curriculum to his division.

"I was facing managers with up to 15 years' experience, and their attitude was, 'Show me,' " he says. "They said they had too much to do, but once they became involved with the program, they were more positive. We had to prove it had value and was high quality."

Anderson's support of the program was key to its acceptance, says Cynthia Triolo, assistant vice-president for training and human resources within the division. "You need support from the top level. No matter how good the quality of the training, it wouldn't happen if it wasn't for that," she says.

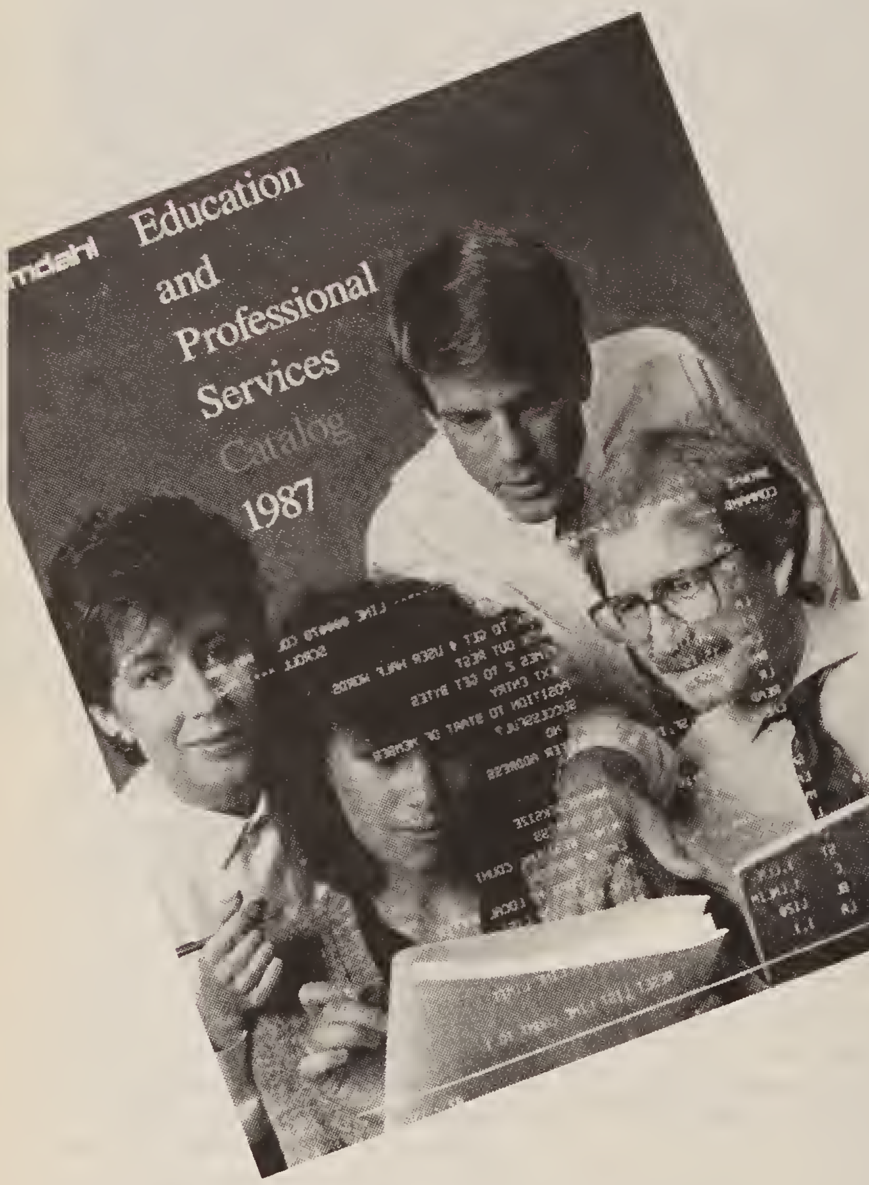
When Anderson took over the division three years ago, there were less than 100 information systems employees. Now the staff consists of 550 people. This rapid rise in manpower caused an urgent need for technical people to become managers. Although it was a logical career step, most of the managers did not have access to management training beyond generic courses offered for other departments. So the information systems management curriculum was implemented.

"We're still playing catch-up to educate those managers," Triolo says. "Some of them came in with management experience, but we want to make sure everyone has that same basic set of skills."

The management program, which amounts to 35% to 40% of the Information Systems Division's training budget of about $100,000 a year, accounts for 2% of Prudential-Bache's information systems budget. At the heart of the curriculum are two core courses — "Leadership Education" and "Managing Work Relationships."

Leadership Education, a customized version of a course offered by Learning

Continued on page S6



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INTERVIEW
ON THE FAST TRACK

Terry Ebert is director of training and recruiting for Finance and Administration and Operations at Morgan Stanley & Co. in New York. He is responsible for information services and entry-level and advanced training. Ebert was interviewed by *Computerworld* senior writer Michael Sullivan-Trainor.

What are Morgan Stanley's business goals, and how do they relate to MIS training?
In the investment banking environment, we live or die with data processing. Our overall goals are to increase systems availability, control costs and increase user satisfaction.

Technically, we want to improve the efficiency of our coding, improve response time and improve systems stability.

On the management side, we want to make the information systems professional as aware of the business as the users so that he can have input in user meetings that deal with business objectives.

Our specific management goals are to increase the efficiency of our operation, maintain a positive environment and reduce turnover. We have about a 15% to 20% annual turnover, but it was higher than that before the training was introduced.

When you instituted your training program, did you have to convince the information systems people who were in place that the training was worthwhile?
I developed the program in 1982, when I came on board. We didn't have to convince people of the need for training because back in 1979, when the entry-level program was implemented, Morgan Stanley's information systems department went through a tremendous change.

A very strong individual, both politically and personally, took charge of the department then, and he had a clear vision of how he wanted the department to be shaped. So 1979 through 1981 was a period of great transition when many people simply left of their own accord and other people, who had worked with the new department head, were hired. The department was only 35 to 40 people strong at that time because we only had a New York office. Today, there are 700 people, located in London, Tokyo, Frankfurt and Geneva, with new offices opening in Hong Kong and other areas in '88.

Describe your curriculum for the information systems organization.
There are three strands in our training: the technical, which starts as soon as an employee comes into the organization and continues through his career; the business, which starts toward the end of the first year and continues; and management training, which begins in the latter part of the second year.

At the entry level, rather than hire computer operators, we bring in college students. Their training begins by performing that function. They are brought into operations at the data center, and for the first six months, they are in a formal program. For the first two months, they work 60 hours a week. Forty hours of that is actually working as operators, and 20 is on-the-job training.

After qualifying as operators, they learn programming for four months. At the end of six months, we have people who have worked as operators and are able to cycle into our systems development or applications programming department.

What about more advanced training?
We teach everything from advanced natural programming techniques to user consulting skills. In addition, we teach our people about the investment banking community. They learn financial accounting and corporate finance in courses taught by faculty from MBA programs at local universities.

What are the components of management training?
Management training includes courses ranging from very basic management skills, like effective business communication and time management, to project management. Our entry-level people will typically be managing others after about two years.

Who teaches these programs?
We use a mix of in-house staff teaching in their areas of expertise and external consultants. The curriculum is developed cooperatively by our staff and the consultants.

ALAN WITSCHONKE

Terry Ebert

On the technical side, the Adabas courses are all taught by our senior staff in that area. We have an optimization group, which works to make our code more efficient, and members of that group teach courses in the programming area. Structured design and testing is taught by Arthur Young Co.

In the advanced training, we use some of our traders — people who actually work at the business of the firm — to teach about their markets.

Do you meet with any resistance from your technical people concerning their need to learn management and business skills?
We don't, partly because we select the people to work in this environment very carefully. We require bright people, but because of the emphasis on business and leadership, we are very different. A lot of people who do

Continued on page S15

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Management

CONTINUED FROM PAGE S4

International, Inc. in New York, deals with interpersonal skills, managing work relationships and motivating DPers.

After taking the leadership class, managers move on to a course in managing work relationships developed by Ridge Associates, Inc. in Casanovia, N.Y. The course provides participants with an understanding of how others view their behavior. It includes a review of the managers' personality strengths and weaknesses and examines how they respond under stress. Managers also learn how to adjust their personality styles to work more productively with others.

> WHILE formal management programs allow all of a company's managers to attain the same skills, informal ones give managers an opportunity to develop their own ideas about necessary management skills.

Customizing each course to address the specific needs of the company's information systems managers is an important part of the curriculum. Learning International and Ridge Associates were chosen as vendors because their courses could be designed to apply to the practical needs of the department, Triolo says.

Unlike Prudential-Bache, other companies provide only minimal DP management training to supplement generic corporate education.

In these environments, managers must seek out their own courses or petition the company to bring a consultant in-house for a one-time presentation.

"Large companies identify a fast-track route for certain individuals, and they offer specific management programs to train them," says John Cargill, the Data Processing Management Association's (DPMA) director of education. "Smaller companies do not have the resources to implement their own programs, so they need to take advantage of outside seminars."

In and out of the nest

American Fletcher National Bank & Trust Co. in Indianapolis, recently acquired by Bank One, offers some supplemental DP management training on an as-needed basis, but managers are encouraged to seek out their own courses. "Traditionally, we have provided training through human resources as the primary source," says Phil Shaw, information center analyst. "But we also contract with vendors for occasional in-house programs."

When a batch of DP managers needs to be trained, Shaw provides multimedia seminar programs from Deltak Training Corp. in Naperville, Ill. The programs, which include "Time Management" and "The Middle Manager as Innovator," allow self-paced learning using text and video cassettes. Besides the Deltak program, the bank also uses an informal buddy system that pairs new managers with experienced ones.

While formal management programs allow all of a company's managers to attain the same skills, informal programs give managers an opportunity to develop their own ideas about necessary management skills. At Bank One, Paul Bangert's development from a systems programmer to asistant vice-president of DP included a mixture of in-house and vendor training.

After 12 years as a programmer, Bangert now manages the bank's systems programming staff of 10 programmers working in IBM's CICS, VTAM, VM and MVS environments. He acquired his management skills through in-house human resources courses, such as working with people, rational decision making and performance appraisals, as well as by attending management courses offered by local schools and an IBM course in project management. But the key to Bangert's satisfaction with his current post is that he still maintains his technical expertise.

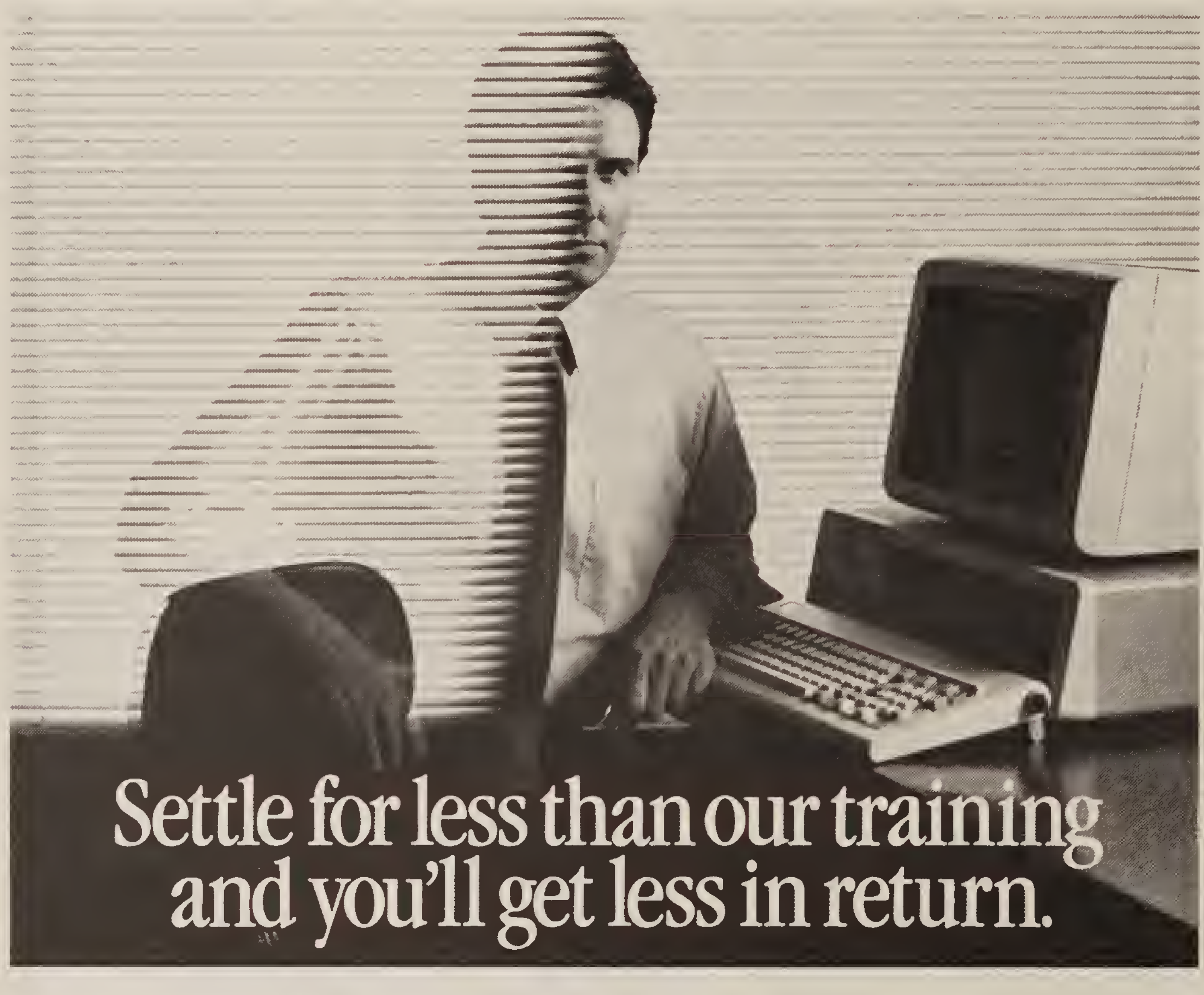
"I still like being a technician. I enjoy training some of the junior people, and I am very much trying to stay technically current by working closely with my staff. I would not want a position that is 90% management and 10% technical," Bangert says.

The transition is not without some sacrifices, however. "One of the more difficult things is not having as much hands-on work," he says. "Now, I'm working through two layers of people, which is hard to get used to. I had to develop trust in the competence of the technicians working for me."

Hiring from within

A lack of resources for management training doesn't mean the training needs to be unavailable. Even small companies can find creative solutions to meet their requirements.

At Star Market Co. in Cambridge, Mass., DP Director Allen Williams identifies which technical people would be suited for management by assigning senior staff members to train newcomers and observing their performance. If the staff member likes the training experience, he can then take a series of courses offered by an outside vendor to develop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his management skills.

Management training requires $3,000 a year, or 50% of Williams' training budget and less than 1% of the DP budget.

Another alternative to in-house seminars are sessions sponsored by professional associations. The DPMA offers annual seminars nationally and regionally to provide business and technology education. The DPMA is currently considering offering management training courses in its 1988 programs.

Budget limitations notwithstanding, a healthy vendor community is growing to meet MIS managers' educational needs. Seeing a lucrative market niche, management consultants and technical training companies are targeting management training for technical professionals. However, not all the vendors are as expert in the area as they claim.

Trust the vendor?

"Choosing a vendor is really difficult, because a lot of them say the same things," says Terri Pawlowski, manager of technical education at the Hartford Insurance Group in Hartford., Conn. "They are very articulate, send you jazzy brochures and sound good, but you never know until you have them in."

Many of the vendors come from psychology and marketing backgrounds rather than MIS. Vendors who do not have experience as MIS managers fail to provide practical training, Lockheed's Folick says.

"There is not a lot of practical experience in these courses. Everything is very theoretical," Folick says. These consultants should really go into a shop and become part of a project team. Then they could come back with real-life experiences."

Measuring the effectiveness of management training, whether developed in-house or purchased from a vendor, is particularly difficult. "Most companies don't have any systematic way to determine whether the training worked," says Charles Wilson of Southern Training Corp. in Columbia, S.C.

Although most of the results of management training, such as changes in employee behavior, often defy quantitative measurement, companies can do a better job of determining effectiveness if they first identify exactly what they hope to gain by the training, Wilson says.

He says that objectives should be spelled out for the class and then, three to six months later, the trainer should ask the participants, "Based on the objectives, what are you doing differently?" Then he should ask the supervisor if he sees any changes in the trainee's behavior. The same kinds of questions should be asked of the trainee's employees.

Many companies use evaluation forms filled out by the participant to determine the effectiveness of management training. Others are also debating whether to interview other people in the trainee's department.

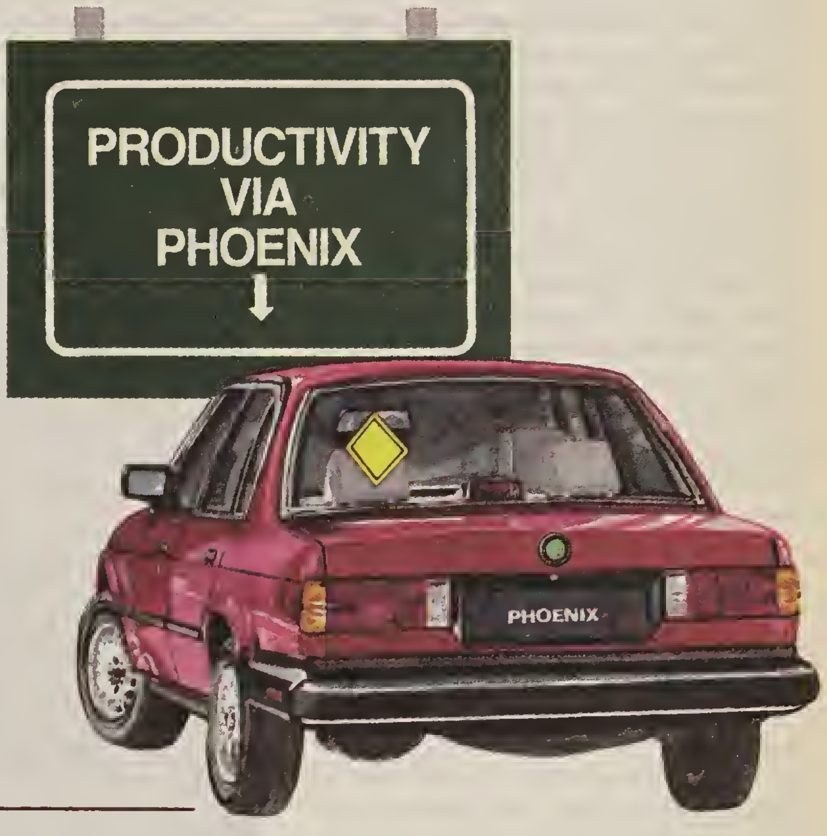
On one side of the debate is Bank One's Shaw.

"Talking to the manager's manager often leads to inaccurate perceptions. He isn't out in the trenches to see what's going on. He only sees whether the job is getting done and whether the reports are on time. He says, 'I don't see a whole lot of people quitting, so it must be OK,' " Shaw says.

On the other side, Prudential-Bache's Triolo says he is considering conducting interviews of the manager's employees to evaluate effectiveness. The managers will probably not like the idea, Triolo says, but the need to assess the effectiveness of the training may override their concern.

Prudential-Bache's Bigham rates management training by how useful the skills are to his situation. For example, he says he knew he was skillful at getting people to do things his way, but he didn't know why. After taking a course in managing work relationships, he discovered that he was unconsciously flexing his personality style to accommodate the style of the person he dealt with.

"Many of the things you learn in management training you knew intuitively, but you didn't know why they worked," he says. "Once you find out why, you can make them work almost every time." •



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The ideal MIS training program would include computer-based courses for technical subjects, interactive video systems for specific project skills and dynamic seminars led by popular management consultants for complex business issues.

However, few organizations can afford such an ideal combination of training media. For example, hiring an outside consultant to conduct a traditional instructor-led seminar can cost up to $1,500.

Computer-based training (CBT) can cost substantially less, since courseware runs on existing hardware. Vendors provide personal computer diskettes for a few hundred dollars per course and sell mainframe-based products for the price of an annual software license. However, the cost to develop an in-house CBT system can range from $2,000 to $20,000.

Combining CBT with video, some companies are using interactive video instruction (IVI). Because specialized hardware is required to run IVI programs, setup costs can run up to $100,000.

"There are a number of trade-offs between types of training. With CBT and video, the costs come from the development of the course, but delivery is relatively inexpensive. Classroom training is just the opposite," says Curtis Plott, executive vice-president of the American Society for Training and Development.

Moving along, but slowly

IVI is expected to become more affordable as the technology develops. Many companies are expected to eventually replace instructor-led training with more interactive, individualized programs.

"Training technology is proceeding at an incremental, rather than a revolutionary, rate," Plott says. "Companies are moving toward sophisticated technologies because they're cost-effective."

Evidence of this trend can be seen within MIS, particularly in technical training. Besides mainframe-based courses that allow users to duplicate a systems environment on a terminal, many companies are implementing PC-based courses to allow individuals to learn at their own pace.

However, CBT and IVI are not as frequently implemented for management training. Many instructors say that interpersonal skills cannot be adequately taught using a computer-based product.

"When you are presenting information about the changing nature of management, it is harder to teach through technology," Plott says. "Management skill development is experiential and requires practice in dealing with groups of people rather than individually."

"The best way to offer management skills to technical people is through an instructor-led course that shows them on paper what will be covered and when," says Terri Pawlowski, manager of technical education for the Hartford Insurance Group.

At the executive level, technology is rarely used because senior managers demand a customized program. "Typically, executives are not the type of audience that sit in front of a PC," says Suzanne Rambach, marketing manager for end-user and professional development at Deltak Training Corp. "They go to seminars where someone dynamic is up there sharing personal experiences."

Another objective of the instructor-led management skills workshop is to convince MIS professionals of the need for training. "There is a tremendous amount of marketing that goes on," says Ann Bankead, training and organizational development specialist for a bank in the Southwest. "If we were solely depending on CBT, that opportunity would be lost."

Despite the desirability of interpersonal contact, cost-cutting programs are forcing MIS trainers to make some concessions in the management area. The most significant example of this trend is replacing live speakers with video tapes.

More affordable than instructors, videos allow for consistent presentation quality and guarantee that all participants receive the same message even if they attend different viewing sessions.

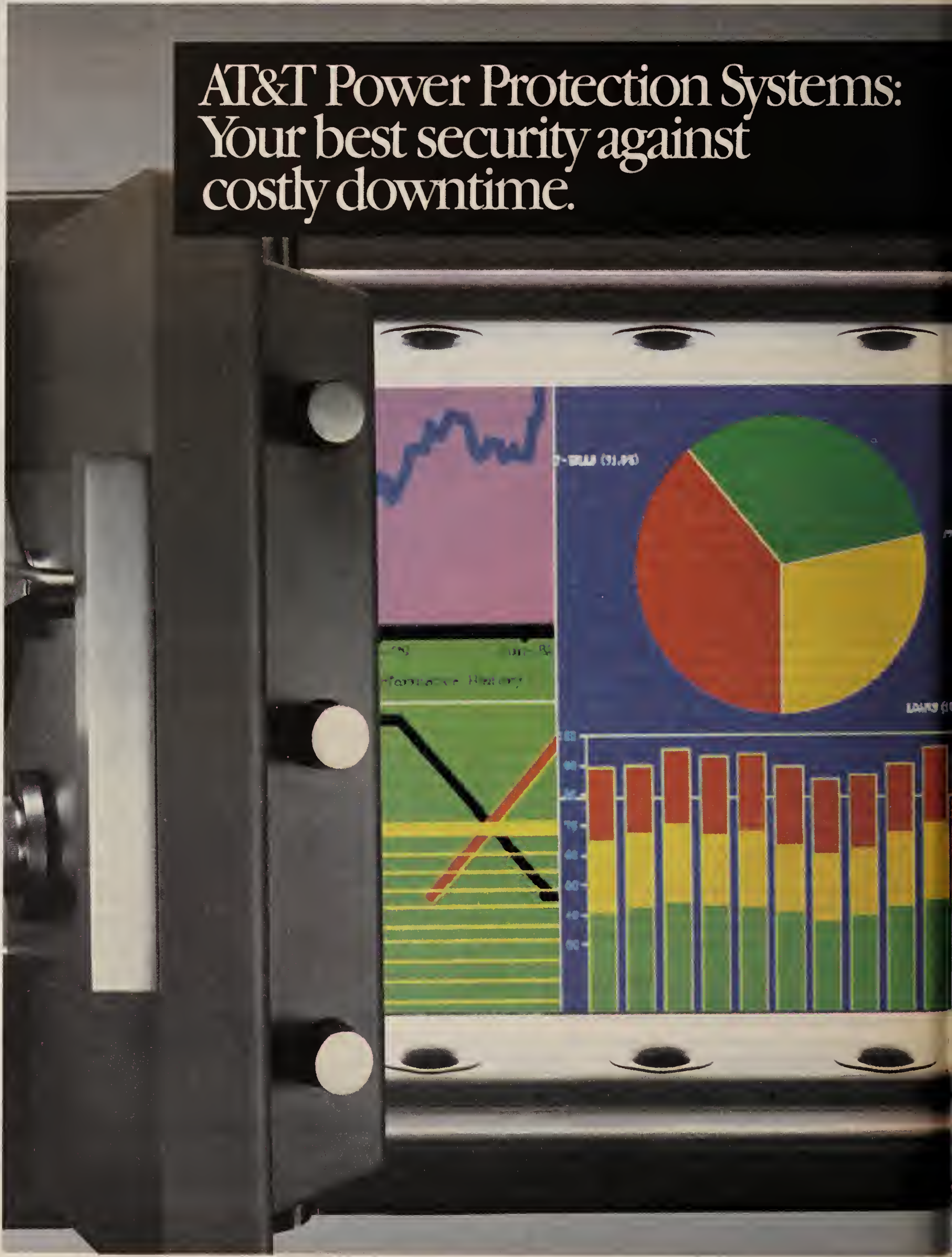
Videotaping participants and then allowing them to view their performance is another cost-effective method used by many companies. "Dispensing information in the classroom produces one level of retention; dispensing reinforced by visuals and seeing how to do it produces an increased amount; hearing, seeing and practicing produces an even larger amount of retention," Plott says.

In the future, Plott says, IVI will become as useful as video for management training. "It is a way to take the material away from the classroom and practice."

Training vendors such as Deltak indicate they are planning to implement IVI in their professional development offerings when it becomes more affordable.

"Interactive video is great for simulations and checking information," Rambach says. "It's like using a flight simulator. You practice almost crashing a 747 before you learn how to fly it."

MICHAEL SULLIVAN-TRAINOR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VENDOR VIEWPOINT

Going from systems professional to manager means learning to live with some uncertainty

BY STEWART STOKES

My client was a senior systems manager in a well-known company. He and I were discussing changes in his career. I asked him to describe his most difficult challenge, and he replied without hesitating: "The most difficult challenge of my career? That's easy. No, it wasn't technical. It had nothing to do with hardware or software, but it did involve communications — and I don't mean data communications.

"My most difficult challenge was making the transition from 'doer' to manager," the client continued, "and frankly, I'm still working on it! Why is this so difficult for us? I suspect it has something to do with change and giving up predictability for ambiguity." Learning to live with uncertainty is only one of six key challenges systems managers face as they make the transition from systems professional to systems manager.

Countless conversations during the past 15 years have convinced me that most new systems managers confront six challenges as they make one of their career's most demanding transitions:

- Developing management-mindedness; learning to appreciate the power of perception or the fact that not everyone perceives, understands and acts on an issue in the same way.
- Managing vs. doing, or learning to let go.
- Delegating, the most important time-management strategy of all.
- Living with ambiguity, or uncertainty vs. certainty.
- Influencing people over whom you have no control; understanding sources of power and influence.
- Understanding and analyzing motivation.

Developing management-mindedness means learning to step outside one's technical orientation to see the big picture. It means learning to understand and appreciate differences in perception and the ways these differences influence behavior. This insight in itself helps resolve major interpersonal communication problems.

> "I THOUGHT that managing meant controlling and always being in command. I soon learned there are few answers and that the only certainty is lack of certainty."
>
> MIS MANAGER

As a new systems manager told me, "I never realized how significant it was that my staff, our users and my fellow managers could all look at the same set of circumstances and understand them so differently. No wonder we seldom agree on a course of action."

Another aspect of management-mindedness is learning to think conceptually to understand how the pieces fit together. Some senior information systems managers are currently both exhibiting and fostering this skill by educating their people about the business, its products, markets, channels of distribution and competition.

The second hurdle, that of managing rather than doing, haunts some systems managers throughout their careers. They become managers because they were good "doers," but when they turn a career corner and become project leaders, their focus of accountability shifts. They are now responsible for managing and coordinating the work of others, many of whom are actually outside their chain of command.

New information systems managers often find this kind of assignment unbearably vague. While their activities as "doers" had a degree of certainty and predictability, their managerial assignments are filled with ambiguity.

"The lack of clear and concise answers was what bothered me," another client once confided. "I thought that managing meant controlling and always being in command. I soon learned there are few

Continued on page S13

Stokes is vice-president of QED Information Sciences, Inc. in Wellesley, Mass.

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What's so difficult about technical training?

BY PATRICIA CINELLI

Technical trainers of data processing personnel must wrestle with a number of challenges. Often, they are required to teach technical and end-user courses as well as develop the curriculum. They must deal with a lack of support and interest on the part of their students' managers. And what is worse, technical trainers often find themselves in a classroom with people who don't want to be there or think they already know how to operate the system.

Trainers from across the country spoke with *Computerworld* about some of these challenges. They were asked three questions:

- What do you find is the most difficult aspect of technical training?
- What kind of course is the biggest challenge?
- What sort of person makes the most challenging student?

Donohue

Bill Milburn is a DP training specialist for the Auto Club of Southern California in Santa Ana. He researches, analyzes and develops training to be administered by himself and others. Milburn remembers an entry-level training class built around PL/I as one of his more challenging teaching experiences. "Getting all the information together for a complete curriculum on a subject as complex as that is probably the most difficult aspect of technical training," he says.

Similarly, he says, the type of course that presents the biggest challenge is one for which he has no prior knowledge and has to learn about the topic. "We seem to be one of these companies on the leading edge and are always pioneering something. Even in the PC area, we can't settle for a program like Wordstar. Instead, we purchase an all-encompassing modular approach like the Personal Decision Series, which no one anywhere teaches. That means I have to learn it from manuals and from IBM marketing people," Milburn says.

Bell

The type of student who presents the greatest challenge is one who is not attending the course voluntarily — "the one who is there because his boss said, 'You must learn this,' " Milburn says.

Sandra Donohue is now a consultant and executive assistant to the associate commissioner of systems at the Massachusetts Department of Public Welfare in Boston. Before taking that post, she trained data processing personnel in the department for six years.

According to Donohue, the most difficult aspect of technical training is putting the right people together with the right course at the right time. Often within the same course, she says, some students find the material too simple, while others find it too hard.

Donohue also expresses frustration at the lack of commitment technical training receives from students as well as their managers. "I'm not sure if their bosses pull them out of class or don't let them attend or if people sign up for courses and don't really expect to go, but the actual attendance in a course is usually less than the number who have signed up for it," she says. Donohue has some ideas about why this happens. "Training," she says, "tends to be seen as a benefit and not as part of the job."

Hargrove

The kind of course that presents the biggest challenge, according to Donohue, is one that attempts to provide technical people with skills like writing or management. She has found, she says, that technical people usually enjoy and want to attend technical training courses, but interesting them in training that covers softer and more general-purpose skills takes some work.

Two types of people can be difficult as students, according to Donohue. The first is an individual who has been in the business for a long time and who already knows a great deal. Often, she says, people like this are trapped in habit and really don't want to learn anything new. On the other hand, she adds, those just out of school can also be difficult to teach because they frequently suffer from the illusion that they already know everything.

Perren

Chuck Bell, advanced training instructor at Marathon Oil Co. in Findlay, Ohio, says the low priority accorded to training is particularly frustrating. "People find it hard to set aside time for the courses," he says. "Even though a class is set up ahead of time, some supervisors override attendance at the course with their own projects and make it difficult for employees to take classes at that time."

Teaching courses to audiences of varying skills and interest levels is particularly challenging for Bell, who says end users often show up in classes dominated by technical people. "It becomes a challenge to get working examples throughout the course to cover the needs of varying kinds of students."

Bell's notion of the two types of students that present different challenges includes the introverted student who does not actively participate in class and the inquisitive, aggressive student. "When someone is quiet in class and doesn't ask questions, I don't know if I got through clearly or have blown him away. On the other hand, the person who continually speaks out in class stretches my ability and makes me grow."

Bob Hargrove, security and contingency planner at the University of Texas Health Science Center in Houston, has been conducting technical training classes for about six years. One goal he has yet to accomplish, he says, is that of making training a planned and integral part of the employee development process.

Managers don't plan ahead for

Continued on page S11

Cinelli is a free-lance writer based in Washington, D.C.

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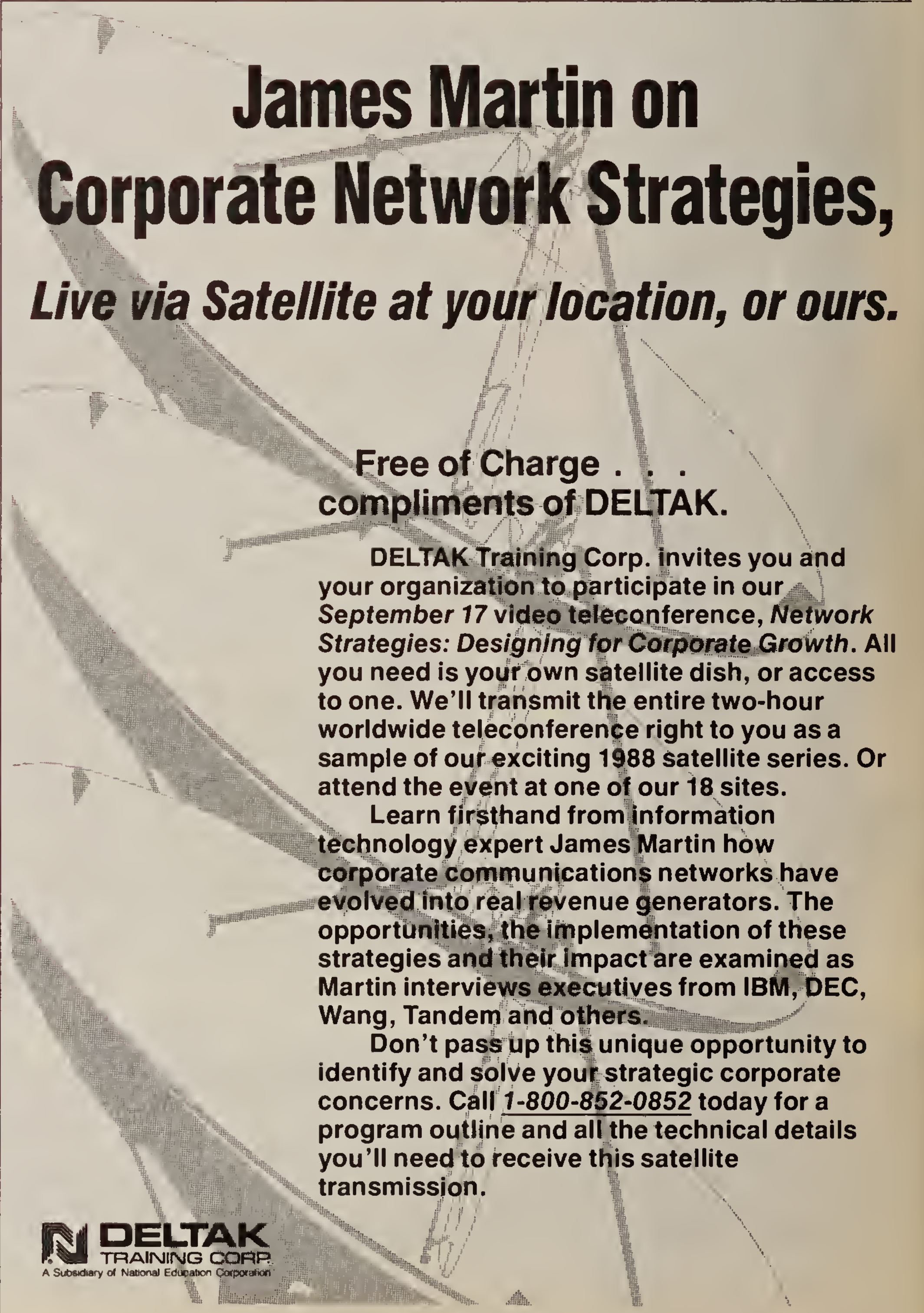

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The American Institute, Inc. **(201) 822-1230**	Hands-on training seminars, demos, lectures	Yes	Troubleshooting data communications networks, hands-on data communications, X.25, T1, SNA, LANs	Data communications specialist	Training or job experience in data communications	Workbook, glossary, reference manual, break-out boxes	Optional	3 days	None	Standard on-site	$895
Applied Science Associates, Inc. **(412) 284-7300**	Custom-designed user training for delivery in all media (classroom), self-instructional workbooks, CBT[1], videotape, videodisk	Optional	Data entry, retrieval, error recovery	Entry-level to experienced data processing personnel	Elementary keying skills	Instructor manuals, student guides, workbooks and/or job aids as requested by client	Optional	1 hour to 6 weeks	None	Standard	Contact vendor
Array, Inc. **(312) 272-3699**	Technical and custom videos, workshop, classroom training	Optional	FAS, TSO/ISMS, C-List, JCL, structured analysis and design	Programmer/analyst	One year programming experience	Workbooks, job aids, free hot line for questions	No	3 days	CBT, CBT IVI bst	Standard on-site	$800 (per day)
The Atlantic Systems Guild, Inc. **(212) 620-4282**	Seminars, licensing packages	No	Use of structured analysis, structured design, information modeling tools and strategies	Programmer/analyst	Minimum six months programming experience	Textbooks, bound copies of visuals used in course presentation, handout exercises	Optional	2 to 5 days	Management training	Optional	$500
Atre International Consultants, Inc. **(914) 967-2037**	Consulting and training, DBMS conferences, classroom training, Atre Methodology for Data Base Design	Yes	40 different courses for data base design and implementation	Data base analyst and administrator	Familiarity with data base concepts	Software, workbooks	Optional	1 to 5 days	None	Optional	$250 (per student per day)
Auxton Computer Enterprises, Inc. **(201) 572-5075**	Classroom training	No	C language, Unix, IMS, PL/I, CICS, TSO	Programmer/analyst	Preferably six months to one year experience in programming languages	Instructor manuals, student guides, lab exercises and solutions	Yes	1 to 5 days	None	Optional	$75-$250
Barnett Data Systems **(301) 762-1288**	Conferences, classroom training	No	Data dictionaries, data and process modeling, entity and relationship modeling	Data administrator, analyst	None	Textbooks, workbooks	Optional	3 to 5 days	Hands-on experience	Optional	$795-$1,345
Benchmark Technical Services, Inc. **(203) 346-4661**	Classroom training, seminars	No	Data base design and application programming	Application programmer	Six months programming experience	Workbooks, handouts	Optional	3 days	None	Optional	$250
CRWTH Computer Coursewares **(800) 282-2372**	CBT, courseware	Yes	Project development, decision support, application development tools, data bases, graphics	Entry- to executive-level DP personnel	Course-dependent	Workbooks, installation guides, course modification guide	No	2 to 20 hours	—	Optional	$26
Ciber, Inc. **(313) 271-1221**	On- and off-site classroom training	No	CICS, DB2, VSAM, Xpediter, IMS, productivity tools including VS Cobol Workbench	Programmer/analyst	Six months programming experience	Workbooks, textbooks, exercises, reference cards	Optional	3 to 5 days	None	Standard	$125 (per day on-site), $190 (per day off-site)
The Communication Workshop **(718) 575-8000**	On-site seminars, one-on-one tutorials	No	Technical writing for the DP professional, improvement of structure, style, format of documentation, memos, proposals	Any systems analyst, programmer, project manager	None	Telephone hot line for immediate feedback on writing	Optional	2 days	Business writing	Standard	$225
Computer Technology Group **(800) 323-8643**	Interactive videodisks, on- and off-site seminars and classroom training, video	Optional	Unix fundamentals for programmers, Unix fundamentals for nonprogrammers, Unix System V internals, Unix overview, Unix System Shell, C language programming	Entry-level technician to technical support/systems programmer	Course-dependent	Hands-on exercises, tapes, student guides, administrator guides	Optional	1 to 5 days	None	Optional	Contact vendor
Compuware, Inc. **(313) 540-0400**	Live education, classroom training, hands-on workshop	No	Managerial overview, IDMS, IBM environment, DB2 overview, IMS	Programmer/analyst	Minimum three to six months experience	Extensive student guide, exercises, handouts, foils, supplementary text	Optional	2 to 5 days	None	Optional	Contact vendor
Steve Comstock **(303) 355-2752**	Training material, classroom training	No	Programming language skills, analysis, JCL data management skills	Programmer/analyst	Course-dependent	Instructor kit, annotated instructor guide, handouts, exercises, transparencies	No	1 day to 4 weeks	None	Standard	$140 (per student per day)
Consortium of Computer Education and Programmer Training **(207) 780-9281**	Consortium training	No	Skills training, SAS, systems analysis and design	Programmer, project manager, director	Course-dependent	Supplied by vendor	Optional	2 days	Participation in users groups, subscription to management and technical journals and magazines	Optional	Contact vendor
Institute for Advanced Technology (a division of Control Data Corp.) **(301) 468-8424**	Seminars, hands-on workshops	No	Voice/data communications, DBMS and DP operations, software-engineered AI, integrating information systems, PCs, professional/management development	Administrators, managers, programmers, analysts	Varies by course	Student handouts, workbooks	Optional	2 to 5 days	—	Optional	$585-$1,195
Corporate Resource Associates, Inc. **(415) 593-0944**	Customized services, classroom training, seminars, CBT, video courses, interactive videodisks, combined formats	Optional	Client-determined	Entry- to executive-level DP personnel	Course-dependent	Instructor manuals, workbooks, appraisal sheets	No	Client-defined	—	Standard	Contact vendor
The Courseware Developers **(203) 646-4105**	CBT	Yes	DB2, SQL/DS, QMF, CSP	Programmer/analyst, end user	Basic DP background	Workbooks	No	14 to 16 hours	None	Not provided	$2,000-$8,500
Database Management, Inc. **(203) 646-3264**	On- and off-site instructor-led classroom training, seminars, hands-on workshops	No	IMS, DB2, SQL/DS, CICS, VSAM, Focus, CSP, APS, AS	Application development personnel, project designer, systems analyst	One to two years experience programming or design background	Comprehensive course handouts	Optional	1 to 5 days	None	Standard	$125
Data Kinetics, Ltd. **(613) 238-6709**	Hands-on workshops, classroom training, seminars	No	IMS/DB/DC, table-driven programs training, Mark IV, VM/CMS, QNX, Focus	Programmer/analyst	Some programming experience	Exercises, glossaries, reference guides, manuals	Optional	3 to 5 days	None	Optional	$800 (per 5-day workshop)
Datapro Research Corp. **(800) 328-2776**	On- and off-site seminars, CBT	Optional	Basics of communications, data and telecommunications, PC networks, micro-to-mainframe connectivity, SNA, network and protocols, IBM teleprocessing	DP professional, communications, marketing, technical support	Course-dependent	Notebook, Datapro reference reports	Optional	1 to 3 days	Trade articles, related books	Optional	$750
Data Tech Institute **(201) 478-5400**	Hands-on workshops, in-class demonstrations, classroom training, seminars	No	Examining IBM PC, XT, AT and compatibles, networking IBM PC and compatibles, planning and designing a digital T1 network	Programmer/analyst, DP manager, decision-support manager	Course-dependent	Instructor manuals, workbooks, glossies, catalogs, some software	Optional	2 days	—	Standard on-site	Contact vendor

[1] Computer-based training [2] Interactive video instruction

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Technical

FROM PREVIOUS PAGE

courses, Hargrove explains. "When they want a course, they always want it yesterday." Instead of treating training like a vigilante operation, he says, managers should incorporate assessment of training needs into performance evaluations.

The biggest hurdle that Hargrove says he encounters with courses has nothing to do with content; it is related to poor planning and coordination on the part of managers who send their staffs to a course on something like CICS when there is no immediate opportunity for them to put it to use. "Often," he says, "students don't get a chance to use what they learn right away, and when that happens, you start running into the skills-extinction curve."

The type of student that Hargrove least likes to have in his classroom is the computer scientist. "Computer scientists know no language except their own," he says, "and they have a mindset about everything."

How much is enough?

Figuring out how much is enough is one of the trickiest parts of a trainer's job, according to Bernie McGinley, data center education coordinator at Pittsburgh National Bank. Students come to McGinley's classroom with differing needs, and tailoring the training to a varied audience can be difficult.

For example, he says, "when we install a new software package, some who take the class need to know the finest details about the package, and others just need to know the barest facts."

Lack of turnover in his industry — in which the average stay of operations personnel is 15 to 20 years — contributes to the difficulty of technical training, McGinley says. People master a certain set of skills and tend to develop set patterns of thinking and working during the course of several years.

"All of a sudden," he says, "we bring in an IBM System/88 [minicomputer], and people have to learn all new skills. It's extremely hard to transfer from their base of knowledge to this new machine." Training students to break out of established patterns "is the type of course that's hardest for me to teach," McGinley adds.

Motivating the "unconsciously competent" student presents McGinley with his greatest test as a trainer. This type of person has so thoroughly mastered the skills needed to perform his job that he can perform them almost without thinking about it. "Trying to make him curious and excited about learning something new is the biggest challenge,"

Continued on next page

COMPANY	TYPE(S) OF PRODUCT OR SERVICE	DESIGNED FOR SELF-PACED LEARNING	SKILLS OR COMPETENCIES COVERED	APPROPRIATE FOR WHAT LEVEL OF STUDENT	REQUISITE EXPERIENCE OR EDUCATION	TYPES OF SUPPORTING MATERIALS PROVIDED	REQUIRES TRAVEL FROM COMPANY SITE	AVERAGE TIME REQUIRED TO COMPLETE TRAINING	RECOMMENDED SUPPLEMENTAL LEARNING	CUSTOMIZATION	AVERAGE PRICE PER STUDENT
Davis, Thomas & Associates (800) 521-6773	Live training, hands-on workshop, classroom training, seminars	No	VSAM, JCL, CICS programming, MVS concepts	Programmer/analyst	Course-dependent	Handouts, reference documents, IBM manuals	Optional	2 to 4 days	Independent study programs	Optional	$250 (per day)
Dean Lance Smith (713) 721-5499	Seminars	No	Testing and servicing micros, PC data communications, C language, Pascal, assembler	Programmer/analyst, engineer, DP manager, technician	Course- and option-dependent	Workbooks, exercises	No	1 to 5 days	Course-dependent	Optional	Contact vendor
Deltak Training Corp. (312) 369-3000	Instructor-led training, classroom, seminar, video, interactive video, CBT, full training management	Optional	Applications, operations, data base, data communications and systems development training	Entry-level programmer to chief information officer	Course-dependent	Instructor manuals, workbooks, handouts, student guides, diskettes, appraisal sheets	Optional	90 min per course	None	Standard	Contact vendor
Digital Consulting, Inc. (617) 470-3870	Public and on-site seminars, symposia, consulting	No	AI, data base and 4GL implementation and technologies, applications development, CASE², corporate connectivity, PC software and hardware, in-house curriculum	Systems developer, project manager, designer, programmer, technical and nontechnical manager at all levels	Course-dependent	Textbooks, workbooks, foils, exercises, reference materials, evaluations	Optional	4 hours to 5 days	—	Optional	$350-$895
Frank Netzel & Associates, Inc. (312) 359-0371	Customized on-site seminars	No	VM or VM/CMS training concepts, rules, descriptions, Xedit	Data entry clerk to applications programmer	Knowledge of general data processing concepts	Technical handouts, lab exercises	Optional	5 days	Hands-on exposure, technical manuals	Optional	Contact vendor
Freedman Consulting, Inc. (215) 985 4050	Hands-on workshops, classroom training, seminars	No	CICS, OS/JCL utilities, IBM 370 system, assembler	Programmer	Course-dependent; some knowledege of Cobol or assembler	Self-rated homework assignments, course text	Optional	5 days	Prestudy videos	Standard on-site	$950
Garant & Associates (415) 461-8244	Classroom training, seminars, machine exercises, labs	Yes	Technical offerings including CICS, ISPF, Cobol	Entry- to executive-level DP personnel	Course-dependent	Instructor manuals, workbooks, textbooks	Optional	1 to 5 days	—	Standard	$70-$80
Goal Systems International, Inc. (614) 888-1775	Seminars, instructor-led training, courseware offerings	Yes	CICS command-level programming skills, performance monitoring and tuning VM and MVS	Systems programmer	Six months to one year experience	Manuals, case study materials, foils	Yes	3 to 5 days	CBT, video programs from multimedia producers	Not provided	$150-$200
Hane Industrial Training, Inc. (812) 232-0753	Live instructor, hands-on workshop, classroom training	No	Troubleshooting microcomputers, serial data communications	Electronic technician	Solid background in digital electronics with some experience in microcomputing	Instructor manuals	Optional	40 hours per class	Familiarity with operations of test equipment	Optional	$581-$695
The Hartford Graduate Center (203) 548-2470	On- and off-site classroom training and seminars	No	Application/system programming, data bases, JCL and debugging, structural methods, CICS, IMS, VSAM, MVS, systems analysis and design	Programmer, systems analyst	Course-dependent	Textbooks, hands-on training	Optional	2 to 7 days	None	Standard on-site	Contact vendor
Indianapolis Training Consortium, Inc. (317) 293-3833	Training consortium	No	CICS, structured systems analysis and design, advanced maintenance and testing, PC training, information center personnel	Programmer/analyst	Course-dependent	Manuals	No	1 to 5 days	NA	Not provided	$130 (per day)
Information Builders, Inc. (212) 736-4433	Classroom training, seminars, CBT on Focus	Optional	Developing Focus applications, Focus data base design, advanced techniques and Focus internals	Manager and DP professional	Some programming experience	Instructor manuals, course workbooks, problem sets	Optional	—	—	Standard	$475
The Information Engineers (312) 584-9033	Customized services, classroom training, seminars, CBT, video courses, interactive videodisks, combined formats	Optional	Programmer training, programming language, productivity aids, systems analysis and design	Entry-level to experienced DP personnel	Course-dependent	Course-dependent	Optional	2 to 3 hours per course	Reference manuals	Standard	Contact vendor
Information Technologies, Inc. (800) 431-3460	Seminars, classroom training	No	Data communications, micro-to-mainframe gateways, SNA, BSC, 3270 data stream, Netbios interface, application program interfaces	MIS/DP manager, systems engineer, customer engineer, network support specialist	General knowledge in topic area	Manuals, workbooks, lab exercises, copies of overhead presentations	No	2 or 4 days	IBM 3270 programmers guide	Standard	$695-$1,495
Infosci, Inc. (415) 854-1567	On- or off-site live instruction, classroom training, seminars	No	Software maintenance and support, software engineering techniques, software testing techniques, reducing software complexity	Programmer/analyst	Recent college graduate to five years experience	Manual with bibliography, course outline, reading	Optional	2 to 5 days	JCL, language use	Standard	$400-$1,000
Institute for Information Management (408) 559-6911	Classroom training, seminars	No	Capacity planning, capacity and performance management	Technician, data center manager	None	Textbook, exercises, case studies	Optional	5 days per course	None	Optional	$1,250
Integrated Computer Systems (800) 421-8166	Classroom training, seminars, video courses	Optional	Data communications and networks, hands-on PC networking, micro-to-mainframe connectivity, hands-on troubleshooting of data communications and networks	Programmer, engineering manager	General technical/ computing orientation	Volume of course notes, selected technical articles	Optional	4 days	None	Optional	$495-$1,200
International Management Services, Inc. (617) 520-1555	On- and off-site seminars, hands on workshops	No	System and analysis design, design of multivendor CPUs, LAN, data communications networking	Entry- to senior-level DP professional	Course-dependent	Student manuals	Optional	4 hours to 5 days	—	Standard on-site	Contact vendor
Ken Orr & Associates, Inc. (800) KOA-8000	On- and off-site classroom training, seminars	No	Systems development and methodology, systems planning, project management, data design, requirement development and systems analysis, systems maintenance	Systems analyst, DP manager, programmer	None	Seminar manual	Optional	3 to 5 days	Supporting reference materials	Not provided	$800
The Knowledge Exchange, Inc. (803) 772-7000	On- and off-site live education, seminars	No	IBM manufacturing language, CICS, data communications, data bases, analysis management, time-sharing, IBM operating systems	Programmer to DP manager	One to 10 years experience depending on course	Workshops using client's factories, student handouts	No	3 to 5 days	CBT, self-study materials	Optional	$950-$1,200 (plus expenses per day per instructor)
MG Technologies, Inc. (408) 255-8191	On- and off-site classroom training, seminars	No	CICS, VSAM, VTAM	Application programmer	College degree or experience	Workbooks, handouts	Optional	1 to 5 days	None	Optional	$300

Technical

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McGinley says.

For Barbara Stears, supervisor of computer-assisted instruction at McDonnell Douglas Corp. in Hazelwood, Mo., identifying an ever-changing set of needs and arranging for appropriate training in a timely fashion is the biggest obstacle. Often, by the time such training is found, "the need and the environment have changed," she says.

Compounding the problem is a lack of commitment to training on the part of management. "People begin the training and then are pulled out by their own management. Usually they are pulled out of the course to deal with short-term emergencies, which might not necessarily be the best use of their time."

Although occasionally provoked by the young upstart who thinks he knows it all, Stears says she is inclined to make allowances for this category of student. "That person is often the type who tries a lot of new things and has an open mind," she says. Ultimately, it is the person who has "a set way of doing things and doesn't pay enough attention" that Stears is least pleased to find in her classroom.

Can't be bought

Connie Perren, education coordinator for the DP department at the University of Texas medical branch in Galvaston, has been teaching and developing training for almost five years. Before that, she worked as a programmer/analyst.

Perren echoes Stears' experience that finding training in a timely manner is the most difficult aspect of her job. "Some of the education is not something we can buy. We either have to develop it in-house or learn it on our own," she says. And becoming an instant expert is not easy, she adds.

Courses that are of strategic importance to the department and require in-house experts to teach applied theory, as opposed to simple operation, are a particular trial, Perren says, since the training has to wait for a time when that person can be spared from his regular job.

DP managers enrolled in management education classes make the worst students, Perren says. "For some reason, they don't usually apply good management techniques back on the job." Students are expected to apply technical skills learned in a classroom to their jobs, Perren adds, but "softer skills are left in the classroom."

In an "Effective Communication" class, for example, "a significant majority of technical folks and management folks don't think it's worth it to apply the materials learned in the classroom back on the job." ●

COMPANY	TYPE(S) OF PRODUCT OR SERVICE	DESIGNED FOR SELF-PACED LEARNING	SKILLS OR COMPETENCIES COVERED	APPROPRIATE FOR WHAT LEVEL OF STUDENT	REQUISITE EXPERIENCE OR EDUCATION	TYPES OF SUPPORTING MATERIALS PROVIDED	REQUIRES TRAVEL FROM COMPANY SITE	AVERAGE TIME REQUIRED TO COMPLETE TRAINING	RECOMMENDED SUPPLEMENTAL LEARNING	CUSTOMIZATION	AVERAGE PRICE PER STUDENT
MIS Training Institute, Inc. (617) 879-7999	Workshops, classroom training, seminars, video courses	Optional	Audit and security	Entry-level manager	Course-dependent	Comprehensive course notebook, student guide, workbooks	Optional	2 to 3 days	None	Optional	$650
MVC Corp. (800) 448-1444	On- and off-site classroom training and seminars	No	Focus training for programmers, advanced Focus training for programmers, PC Focus for programmers	Programmer/analyst	Some technical background, advanced course requires experienced Focus applications programmer	Focus user manual, workbook	Optional	3 to 5 days	Focus user manual	Optional	$475
McDonnell Douglas Information Systema Group (800) 325-1087	Classroom training, seminars	No	Structural techniques in program design and analysis, implementing structuring techniques with Stratus	Project manager, programmer, analyst, designer, manager	Course-dependent	Manuals, workbooks, handouts	Optional	1 to 5 days	Reading lists	Optional	$975
Mid-Ohio Training Consortium (614) 764-6334	Training consortium	No	CICS, project management, structured methodology	Programmer/analyst	Some experience, college degree	Manual provided by vendor	Yes	3 to 5 days	None	Optional	$125-$150 (per day)
Moulton, Minasi & Co. (301) 596-9206	Workshop, classroom training, seminars	No	AI, data communications, LANs, troubleshooting IBM PC and compatibles, Basic, Pascal, C, Prolog, introduction to DP	Entry-level to advanced programmers	Course-dependent	Instructor manuals, exercises, activities	No	1 to 5 days	Course-dependent	Optional	Contact vendor
Mountain Bell (303) 978-6101	AVIL library, classroom training	Optional	Programming, systems analysis, project management	Entry-level programmer to expert systems analyst	Course-dependent	Workbooks, appraisal sheets	Optional	1 week to 3 months	Concepts of data systems	Standard	$11-$12 (per studeot per hour)
National Advanced Systems Education Services (a aubsidiary of National Semiconductor Corp.) (800) 638-8931	Lecture, hands-on labs, classroom training, seminars	No	VM, MVS, IMS, data base management systems, project management	Systems programmer/analyst	Knowledge of IBM DP fundementals	Student guide	Optional	1 to 5 days	Additional curriculum	Optional	$600-$700
Omnicom, Inc. (703) 281-1135	On- and off-site classroom training, seminars, video courses, tutorials	Optional	Data communications (ISO or CCITT) message handling, packet switching, SNA, ISDN, 802 LANs	Technical manager, marketing manager, senior development staff of hardware and software, all DP and telecommunications personnel	Basic knowledge of data communications technology	Copies of standards and manuals, workbooks	Optional	1 to 5 days	Prestudy videos	Optional	Contact vendor
Parnassus, Inc. (914) 332-9400	Classroom training, seminars	No	MVS, CICS, IMS, operations management training	Entry-level computer operator to operations manager	Course-dependent	Handouts, quizzes, text manuals	Optional	1 to 5 days	None	Standard	$150-$1,250
Performance Development Corp. (609) 921-3770	Workshops, classroom training, seminars	No	Data normalization, design of data base systems, data modeling, logical and physical data bases, developing data base systems standards, relational data base concepts	Data administrator, systems analyst, senior programmer	Basic understanding of DP operations	Handouts	Optional	3 days	Follow-up consulting	Standard	$2,400 (per instructor day)
	Workshops, classroom training,seminars	No	Adabas, CICS, Datacom, IMS, Focus, Model 204 data base	Data administrator, systems analyst, senior programmer	Basic understanding of DP operations	Handouts	Optional	3 days	Follow-up consulting, textbook	Standard	$2,400 (per instructor day)
Pinnacle Courseware, Inc. (408) 972-8383	CBT	Yes	DP concepts for business including access control and security, computers and components, data and DP, programs and languages, the systems development life cycle, DP personnel	Managerial level	Knowledge of IBM PC or compatibles	10 diskettes, user guide	No	16 to 20 hours	Supplemental reading on individual topics for additional detail	Not provided	$595 (per complete course)
QED Information Sciences, Inc. (617) 237-5656	One-day intensive key issues programs for senior systems management and professionals, classroom training, seminars, video courses, CBT, educational planning, consulting, publishing books and monographs	Optional	Data bases, CICS, data communications, networking, programming	Entry- to senior-level DP and communications personnel	Course-dependent	Course notebooks, textbooks	Optional	3 days	Bibliography, video, CBT	Optional	Contact vendor
SAS Institute, Inc. (919) 467-8000	Classroom training, video courses, CBT	Yes	SAS software skills	Entry-level professional	Basic computer skills	Manuals, workbooks, appraisal sheets	Optional	Varies	None	Optional	Contact vendor
Software Information Services, Inc. (206) 455-3589	Classroom training, seminars	No	VSAM training, assembler language	Systems and application programmer, data base administrator	One year programming experience	Textbooks	Optional	5 days	Supplemental reading on VSAM	Optional	$375
Systema Imagineering, Inc. (408) 866-0266	Formal instructor-led classroom training on- or off-site with labs	No	General use of IBM systems for professional and managerial personnel, program development/ maintenance skills for applications programmera, systems installation/ maintenance/ performance evaluation skills for systems programmers	Project leader, manager, aystems/applications programmer/analyst	Prior technical experience	Computer labs, student handouts, workbooks, abstracts	Optional	1 to 5 days	None	Optional	Contact vendor
Triad DP Educators' Council (919) 379-4570	Training consortium, classroom training, seminars	No	CICS, VSAM, DL/1, Intertest, SAS	Programmer, project manager, systems analyst	Course-dependent	Handouts, class manuals, student guides	NA	1 to 5 days	None	Optional	$100 (per student day)
Yourdon, Inc. (212) 391-2828	On- and off-site seminars, consulting services	No	System development and training, project management, testing skills, CICS, IMS, MVS	Programmer/analyst	None	Lecture notes, case studies, exercises	Optional	5 days	Optional textbooks	Optional	$300 - $800

Uncertainty

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answers and that the only certainty is lack of certainty. Managing is certainly situational. What works once doesn't always work."

Many new systems managers are control-oriented: They have a high psychological need to control events and people. While this may work well for individual contributors, it does not work for new managers, because problems at lower managerial levels are often better solved through "soft" influence strategies than through "hard" control measures.

Be a delegator

The third challenge — delegation — requires that the manager relinquish control, which is often a highly threatening prospect. Delegation is one of the most difficult managerial skills to execute well, and much time is lost on sloppy attempts.

There are a number of ways to improve your delegation skills.

- Decide if the job, task or assignment needs to be done at all.
- If it does need doing, review your people and decide who can carry it out most effectively.
- Explain the purpose of the assignment, and share your expectations and objectives.
- Set a realistic time frame.
- Explain to subordinates exactly what is needed and inform them of any deadlines.
- Make sure everyone knows and agrees on the limits of authority you are granting. Don't assume.

We have already discussed the fourth hurdle, that of learning to live with ambiguity. This is a stumbling block for many systems managers. The key to success is being willing to admit that we cannot always control others, that events often seemingly take on lives of their own and that answers to people problems are usually more difficult and unpredictable than answers to technical problems.

Which brings us to challenge No. 5 — understanding your sources of power and influencing those over whom you have no control. Systems managers often ridicule those "soft" skills that are most necessary when managing outside one's span of control. When we do not possess positional power, we must influence through respect, knowledge, insight, information, vision, trust and confidence. These are qualities that new systems managers must cultivate if they are to survive and become successful.

The sixth and final hurdle is often the highest of all: understanding and applying motivation. Motivation is the stimulus to action, the incentive to do

Continued on next page

Management training for DP

COMPANY	TYPE(S) OF PRODUCT OR SERVICE	DESIGNED FOR SELF-PACED LEARNING	SKILLS OR COMPETENCIES COVERED	APPROPRIATE FOR WHAT LEVEL OF STUDENT	REQUISITE EXPERIENCE OR EDUCATION	TYPES OF SUPPORTING MATERIALS PROVIDED	REQUIRES TRAVEL FROM COMPANY SITE	AVERAGE TIME REQUIRED TO COMPLETE TRAINING	RECOMMENDED SUPPLEMENTAL LEARNING	CUSTOMIZATION	AVERAGE PRICE PER STUDENT
Advanced Systems, Inc. (800) 238-2626	Live education, on-location seminar, CBT[1], video training, interactive video instruction	Yes	50 different programs including effective presentation, effective leadership, time management, motivation, team building	Manager, supervisor	None	Instructor manual, workbook, student guide, appraisal sheets, coordinator guide, diskette, textbooks	No	2 to 15 hours	Management seminars	Optional for live training	Contact vendor
American Management Associations (518) 891-0065	Seminars, audiovisual training, publications	Optional	Disaster recovery, design analysis, project management, PC skills, communications, information systems management skills	Technical professional, MIS executive	None	Manuals, reference reading, case studies, handouts, textbooks, diskette template	Optional	3 days	—	Optional on-site	$750
American Micro Media (800) 227-1243	CBT	Yes	Time management, financial training, project management, negotiating skills, performance appraisal, selling skills	New or experienced manager	Course-dependent	Documentation, reference guides, workbooks	No	60 to 90 min	None	Not provided	$99
American Society for Training and Development (703) 683-8100	ASTD conference on technical and skills training with 144 concurrent sessions.	No	Managing technical training	Technical manager, specialist, engineer, DP manager	None	NA	Yes	3 days	NA	NA	$375-$450
Applied Science Associates, Inc. (412) 284-7300	Self-instructional workbooks, CBT, videotape, video disk	Optional	Features and functions of systems software, analysis and interpretation of system reports	Entry-level to experienced DP personnel	Elementary keying skills	Instructor manuals, student guides, workbooks and/or job aids as requested by client	Optional	1 hour to 6 weeks	NA	Standard	Contact vendor
Arnoudse & Oullette (603) 625-4164	Seminars, video, independently administered learning systems, interactive limited-enrollment workshops, on-site consulting services	Optional	People skills, improving consulting skills of the information processing professional, how to deal effectively with end users	Information center manager, consultant, programmer, analyst, MIS manager	Information center, MIS or DP environment	Student workbooks	Optional	1 to 3 days	Real-life case studies	Optional	$250-$795
The Atlantic Systems Guild, Inc. (212) 620-4282	Seminars, licensing packages	No	Software project management, fourth-generation methodologies, project estimating, strategies for rapid and accurate requirements definition	Senior technical personnel, second-level manager, project manager	Three to five years experience in management capacity, familiarity with tools of structural design and informational modeling	Textbooks, bound copies of visuals used in course presentation, handout exercises	Optional	2 to 5 days	—	Optional	$550
Barnett Data Systems (301) 762-1288	Classroom training, seminars, conferences	No	Data administration, strategic data planning, improving systems development classes	Data administrator, technician, senior executive	None	Textbooks, workbooks	Optional	2 to 3 days	Hands-on experience	Optional	$695-$995
Better Communications, Inc. (617) 262-5440	Individualized business and technical writing workshops, instructor-tailored workshops using on-the-job writing, classroom training	Yes	Analyzing your audience, pen and paper problem solving, organizational ideas for impact, increasing writing speed, choosing effective formats, avoiding gobbledygook	Any	None	Textbook	No	1 to 5 days	Practice	Standard	Contact vendor
Booher Writing Consultants, Inc. (713) 955-2525	CBT, self-study, classroom workshop, video	Yes	Thinking process for analyzing audience needs, clarity, organization, grammer, style, conciseness	Entry-level to senior-level DP manager	None	Textbooks, handouts, user manuals	Yes (for workshop only)	7 to 14 hours	None	Standard	$173 (approximate)
CRWTH Computer Coursewares (800) 282-2372	CBT, courseware	Yes	Project management, decision support	Entry- to upper-level management	Course-dependent	Workbooks, installation guides, course modification guide	No	2 to 20 hours	—	Optional	$26
Careertrack (800) 334-6780	On- and off-site seminars, classroom training, video courses	Optional	Time management, presentation, how to deal with difficult people, listening, achieving excellence, power communications skills for women	Any managerial level	None	Workbooks, handouts	Optional	1 day	Audio and video cassette programs	Standard on-site	$48
Compustar, Inc. (201) 234-0652	Floppy disks, job aids designed for individual manager's use only	NA	Leadership skills	Manager/supervisor	Exposure to concepts and skills taught in workshops based on the situational approach to leadership	Floppy disk, user manual	No	User-determined	Workshops on situational leadership approach	Optional	$150
	Floppy disks, job aids designed for individual manager's use only	NA	Performance management, analysis of performance situations, increases the managers ability to coach and counsel for performance improvement with analysis and recommendation for action	Manager/supervisor	Ability to use PC	Floppy disk, user manual	No	User-determined	Understanding of the coaching and counseling process	Optional	$150
	Floppy disks, job aids designed for individual manager's use only	NA	Management feedback systems, basis for performance improvement and management growth and development	Manager/supervisor	None	Floppy disk, user manual	No	User-determined	—	Optional	$150
Consortium of Computer Education and Programmer Training (207) 780-9281	Consortium training	No	Consulting skills, project management, marketing technology in the organization	Programmer, project manager, director	Course-dependent	Supplied by vendor	Optional	2 days	Participation in users groups, subscription to management and technical journals and magazines	Optional	Contact vendor
Corporate Reaource Associates, Inc. (415) 593-0944	Customized services, classroom training, seminars, CBT, video, interactive video diskettes, combined formats	Optional	Standardization of project methodology (client-determined)	Entry- to executive-level DP personnel	—	Instructor manuals, workbooks, appraisal sheets	No	Client-defined	—	Standard	Contact vendor
Deanne Rosenberg, Inc. (617) 862-6117	On-site stand-up training, workshop, films, videos, classroom training	Yes	Interviewing/selection, increasing staff efficiency through quality leadership, how to create and manage a winning team, harnessing stress and how to make it work for you, performance appraisal without criticism, encouraging creativity, managerial basics	Manager/supervisor	None	Handouts, outlines, case studies, simulations	No	Client-determined	Self-evaluation, reading lists, additional courses	Standard	Contact vendor

[1] Computer-based training

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Uncertainty

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something and behave in a certain way.

As another client told me, "What makes me tick is the opportunity to achieve something of value — to accomplish a result that will be visible to others and significant to them and to the company. I'm not turned on by working closely with others, but I need to be more flexible about this now that I'm managing.

"I like freedom and discretion when planning and carrying out my activities, and I'll try and provide this for my people," the client added. "Because I value achievement, I appreciate timely and specific feedback about how I'm doing, and I'll try to provide this also.

"Do I know what motivates each of my people? No, but I'm going to learn as much as possible about them, because the more I know, the better we'll do."

The secrets to motivation

As new systems managers learn about motivation, they realize it is not a medicine they administer to others. It is a combination of personal attitudes that — when understood and acted upon — will cause people to achieve far beyond normal expectations. The motivation hurdle is high, because it is often easier to assume we know what motivates others than to invest the time and energy in understanding our people as individuals and helping them satisfy their inner needs and desires.

Here are six suggestions for developing excellent information systems managers. Coupled with an understanding of the six hurdles, they will give you a head start as you develop yourself as well as others.

- Be as sure as you can that your new systems managers want to manage and are not feeling unduly pressured to do it. The more pressure, the more stress, the less the performance.
- Whenever possible, provide good mentors. Coaching is an art; invest in it.
- Involve managers of managers in the development process. This provides the reinforcement, motivation and security to apply new skills.
- Focus on the values, changes and shifts in motivation required when moving into management, and influence the work environment to support these changes.
- When you send your new systems managers to management education courses, be sure they know why they are attending.
- Try to sense when your new systems managers are ready to learn. For many managers, this is after they have been managing for a while as opposed to before they begin. It can help you to know what you don't know. •

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Development Dimensions International **(412) 257-2277**	Floppy-disk program	Yes	Formulates job description, customized performance appraisal forms and interview guides, aids in job analysis and hiring	Manager/supervisor	Familiarity with IBM PC and compatibles	Full instructor manual	No	2 days	Hiring programs	Optional	Contact vendor
Garant & Associates **(415) 461-8244**	Classroom training, seminars	No	Project management, cost/benefit analysis, information systems planning	Entry- to executive-level DP personnel	Course-dependent	Instructor manuals, workbooks	Optional	1 to 5 days	On-the-job experience to follow up training	Standard	$70-$80 (per day)
Goal Systems International, Inc. **(614) 888-1775**	Instructor-led courseware	Yes	Performance management, time management, decisioo making, writing skills	Entry- to upper-level manager	None	Student guide	No	45 to 90 min	Alternate materials recommended	Optional	$1,500 (per course, unltd. students)
Gold Consulting **(212) 581-4205**	On-site seminars	No	Writing skills, management/supervisory skills, delegation, managing change	Entry- to senior-level management	Course-dependent	Bibliography, course notebook, follow-up consultation	No	2 days	Bibliography including reading and films	Standard	$3,500 (per course), $150-$160 (per student)
Indianapolis Training Consortium, Inc. **(317) 293-3833**	Training consortium	No	Clieot-defined	Entry-level programmer to DP operations manager	Course-dependent	Manuals	No	1 to 5 days	NA	Not provided	$130 (per day)
Information Builders, Inc. **(212) 736-4433**	Classroom training, seminars, CBT on Focus	Optional	Information center management seminar, train-the-trainer workshop	Manager, DP professional	Some experience in DP eovironment	Instructor manuals, course workbooks, problem sets	Optional	—	—	Standard	$475
Infosci, Inc. **(415) 854-1567**	On- or off-site live instructioo, classroom training, seminars	No	Management software support services, project managemeot	Project leader, programming supervisor	One-year programming experience	Manual with bibliography, course outline, reading	Optional	3 days	Supporting work in testing and software engineering techniques	Standard	$700
International Management Services, Inc. **(617) 520-1555**	On- and off-site seminars, hands-on workshops	No	Project mangement	Entry-, mid- or upper-level DP manager	Course-dependent	Student manual	Optional	4 hours to 5 days	—	Standard on-site	Contact vendor
Karten Associates **(617) 986-8148**	Seminars, classroom training, consulting, workshops	No	Mangement of end-user computing, how to develop a mission statement, staff selection, developing effective training programs, measuring success, policy and standards development	Managerial, executive level	None	Manuals, workbooks, handouta	Optional	1 to 3 days	On-the-job experience	Standard	$300-$600
Learncom (division of Sandy Corp.) **(617) 576-3100**	CBT	Yes	Project management, improving employee performance, forecasting, business writing, strategic planning, PC literacy, finance and accounting for nonfinancial officers	Any managerial level	None	Manual	No	90 to 280 min per lesson	None	Optional	$100-$200 (per module)
Learning International **(800) 972-8326** **(203) 965-8444 (in Conn.)**	Seminars, multimedia training materials, videodisk-based training, custom-designed training	No	Problem analysis/decision making, interpersonal communication, strategies for effective presentation, interviewing to hire, critical skills for supervision, customer service communication	Engineers, systems personnel, supervisors, managers, customer service, telemarketing, sales people	None	Instructor training, all support materials (video, wall charts, manuals, workbooks)	Optional	1 to 3 daya	Included in purchase of seminar, additional audio tapes	Standard, optional	$300-$700 (seminar), $175-$330 (materials)
Livingston & Associates **(216) 826-4195**	On- and off-site interactive seminars	No	Strategic planning, developing successful data centers, advanced user interface, technical writing	MIS manager, information center manager/professional	None	Manuals, evaluations	Optional	2 to 3 days	Post and preclass work	Standard	$150 (per student day)
Margann Associates **(617) 547-5233**	On- and off-site seminars, workshops	No	Effective data management, data modeling, comparison of data base products, managing data in networks	Any managerial level	None	Notebook	Optional	3 to 5 days	Reading list	Optional	Contact vendor
McDonnell Douglas Information Systems Group **(800) 325-1087**	Classroom training, seminars, videos, CBT	Optional	Effective listening, time management, stress management, technical presentation skills, effective interviewing, process management skills	Computer operator to executive-level manager	Nooe	Student handouts	Optional	16 to 20 hours	Interactive videos, role-playing	Optional	$240 (per student day)
National Computer Training Institute **(312) 438-8271**	Public and in-house classroom training and seminars, labs, consulting services	No	How adults learn, how to make learning stick, how to design training courses, needs analysis, how to write manuals	Trainer, management level	Mainframe, micro or teaching experience depending on course	Reference materials, two-year membership in National Network of Computer Trainers	Optional	3 to 4 days	Reading, magazine and resource subscription, Annual Computer Trainers Institute for On-going Development	Optional	$895 (for 3 days)
O. D. Resources, Inc. **(404) 455-7145**	Consulting services, written programs, seminars	No	People skills, change facilitation skills	Any managerial level	None	Coocept papers, workbooks, practical applications	Optional	4 hours to 3 days	Immediate application	Optional	$675-$775
Performance Development Corp. **(609) 921-3770**	Classroom training, seminars	No	Executive briefing on information resource management, managing information resource development, data administration, strategic information resource planning, managing information centers, planning and initiating data base products	Mid- to senior-level manager, DP and product manager, system developmemt director, senior analyst	Basic understanding of data processing	Case studies	Optional	3 days	Follow-up consulting, textbook	Standard	$2,400 (per instructor day)
QED Information Sciences, Inc. **(617) 237-5656**	One-day intensive key-issue programs for senior systems management and professionals, classroom training, seminars, video courses, CBT, education planning, consulting, publishing books and monographs	Optional	Systems development, information systems management, interpersonal skills	Entry- to senior-level manager	Course-dependent	Course notebooks, textbooks	Optional	2 to 5 days	Bibliography, video, CBT[1]	Optional	Contact vendor
Ridge Associatea, Inc. **(315) 655-3393**	Seminars, workshops with video feedback	Yes	Interpersonal and communications skills, listening, performance agreements, positive reinforcement, conflict and resolution	First-line supervisor, mid- to upper mid-level management	None	Charts, video feedback, activity-oriented workbooks, textbooks	Optional	1 to 4 days	Additional reading, follow-up mailing	Optional	$100-$175 (per day)
Development Dimensions International **(412) 257-2277**	Floppy-disk program	Yes	Formulates job description, customized performance appraisal forms and interview guides, aids in job analysis and hiring	Manager/supervisor	Familiarity with IBM PC and compatibles	Full instructor manual	No	2 days	Hiring programs	Optional	Contact vendor

Fast track

FROM PAGE S5

well elsewhere just aren't going to do well here. The fit of the individual to the environment is important in our hiring process.

Do you turn away people who are technically proficient but lack an interest in business training?

That really depends on the position. We have people in voice and data communications who don't take the business training. But they are quite unusual. For the most part, people do have to have an interest in the business.

Who participates in the advanced training?

That is open to the staff. All the people who have come through the six-month training program, people we have hired to fill certain positions and experienced staff members attend those courses.

How do you address the different needs of the entry-level group and the experienced staff?

We meet with every person as they come into the firm and review their background and identify what skills they will need. Then we create a training calendar for each person.

Do technical people receive recognition for their proficiency, or are the top positions reserved for business people?

We have a technical career path as well as a management career path. We pay our technical people very well. We have an IBM 3090 Model 400, and we're going to get one of the first Model 600s that rolls out. We write software for internal use that is sold on the outside, so people take significant pride in their technical work, and that work brings in dollars to the firm.

How high does your technical career path go?

The head of the information systems department is a principal of the firm. He will probably make managing director this year, and that is one of the most senior positions in the firm. The telecommunications head is also a principal and is on his way to becoming a managing director. Technical people can rise to very senior positions on the nonbusiness side.

Can they rise to high-recognition positions without becoming a manager?

Probably not. You can rise to quite a significant role without being a manager, but you will be capped off. The cap is at the project manager role. Project managers, for example, often are paid $100,000 a year at our firm. It's unusual, and those are not the majority, but it does occur. ●

COMPANY	TYPE(S) OF PRODUCT OR SERVICE	DESIGNED FOR SELF-PACED LEARNING	SKILLS OR COMPETENCIES COVERED	APPROPRIATE FOR WHAT LEVEL OF STUDENT	REQUISITE EXPERIENCE OR EDUCATION	TYPES OF SUPPORTING MATERIALS PROVIDED	REQUIRES TRAVEL FROM COMPANY SITE	AVERAGE TIME REQUIRED TO COMPLETE TRAINING	RECOMMENDED SUPPLEMENTAL LEARNING	CUSTOMIZATION	AVERAGE PRICE PER STUDENT
Ridge Associates, Inc. **(315) 655-3393**	Seminars, workshops with video feedback	Yes	Coaching, counseling and confronting	Upper mid-level manager to CEO	None	Charts, video feedback, activity-oriented workbooks, textbooks	Optional	1 to 4 days	Additional reading, follow-up mailing	Optional	$100-$175 (per day)
	Seminars, workshops with video feedback	Yes	Managing work relationships, understanding and recognizing behavioral styles, interaction skills	First-line supervisor, mid- to upper mid-level management	None	Charts, video feedback, activity-oriented workbooks, textbooks	Optional	1 to 3 days	Additional reading, follow-up mailing	Optional	$166-$175 (per day)
Thoughtware, Inc. **(800) 848-9273**	Video disk, CBT	Yes	Organizational effectiveness, personal interaction, motivation, time management	Any managerial level	Familiarity with IBM PC, Macintosh	Manuals, workbooks, bibliography	No	2 to 3 hours per program	—	Optional on large scale	$99 (per module)
WBC Systems, Inc. **(312) 725-0630**	Workshops, courseware, classroom training, seminars, video courses, CBT	Optional	Developing user manuals, increasing MIS efficiency, integrating micros and mainframes, business system applications	All levels of management/administration	None	Course-dependent	Optional	—	—	Standard	Contact vendor
Ware Associates **(203) 448-1880**	Stand-up workshop-oriented classroom training	Yes	Human skills, professional analysis skills, professional systems skills, project management	Programmer, systems analyst, project manager	None	Binders, handouts	Optional	1 to 5 days	Course-dependent	Standard	$130 (per student per day)
R. T. Westcott & Associates **(203) 388-6094**	Classroom training, seminars, video courses, CBT	Optional	Team work, development of quality of service, measuring client/user satisfaction, managing conflict and problem solving, time management, key elements for successful DP operations, coaching development	Project leader, director, vice-president of information systems	Course-dependent	Student workbooks, manuals, video, custom design	Optional	4 hours to 5 days	Action planning	Standard	Contact vendor

DP trainers must develop a high tolerance for heat

BY JANE STEIN

Data processing trainers sit squarely on what information technology consultant Michael Hammer has called "the hot seat," an uncomfortable perch located at the intersection of technology, the people who use it and the business purpose for which it is deployed.

Hammer's description suggests that the first quality a good DP trainer must have is a high tolerance for heat, and few in the field would disagree. A competitive business environment, increasingly dominated by the twin phenomena of strategic systems and end-user computing, generates a lot of heat, and those who are overly sensitive have mostly sought cooler resting spots.

The definition of a good DP trainer must start with superior classroom skills. For bottom-line competence, a trainer needs subject matter knowledge combined with basic transmittal skills. Truly gifted teaching, however, is a matter of attitude. "A trainer has to have genuine openness, an absolutely overwhelming need to give out information," says Ralph Desmond, a Boston-based free-lance trainer and consultant. "You want to have somebody who would make a really terrible poker player."

Because of the sheer number of areas a DP trainer may have to address — microcomputer software packages with their never-ending updates and revisions, DP subjects for everyone from applications development programmers to technical support people and, in many companies, "soft skills" such as communications — flexibility is another essential characteristic. The majority of today's DP trainers must be able to handle a variety of topics with authority.

Trainers cannot be satisfied with simply knowing the technology; they also have to be able to relate it to the business it serves. "It's not enough to teach button-pushing" is an exhortation heard so routinely these days in reference to end-user training that it's in danger of slipping into cant. The responsibility for desktop computing's inability to as yet fully deliver office productivity gains is often laid, at least partially, at the feet of trainers — and not unfairly so. Facility with the ins and outs of the myriad features of Lotus 1-2-3 or DB2 or a fourth-generation language is a nice beginning, but the potential of end-user computing lies in the creative application of those features to business purposes.

DP TRAINERS occupy a somewhat nebulous space between troops and management. The good DP trainer will play that position for everything it's worth.

With one foot in each world, DP trainers are in the best position to combine a thorough understanding of the features and capabilities of the technology with knowledge of a company's business needs and procedures. A good DP classroom instructor, therefore, is one who will also take the lead to suggest ways business users can apply the technology at hand to get a new angle on an old business problem or even to initiate an entirely new business strategy.

What about the DP classroom itself? Here, the mandate is to transform the single-minded techie into a contributing business partner. The DP trainer may teach business writing skills, consulting skills and even basic interpersonal communication skills to technical people. But this responsibility is not fulfilled by scheduling an occasional half-day course in business or communication for programmers. It requires that this attitude and approach to the context of technology permeate the teaching of even the most arcane technical subjects.

Despite the business orientation, Mary Texer, supervisor of training and administrative services at the Federal Reserve Bank of Minneapolis, sounds a common theme when she says she finds her best DP trainers to be those who have "been in the trenches actually working with the systems." As she sees it, "We have to train our people in the business. If we have business illiterates, we're not going to meet our users' needs, and our company's not going to make it in the marketplace."

School's never out

What happens in the classroom, though, is only part of the job. Excellent trainers do not limit themselves to looking around for problems to which they can apply a training solution. DP trainers occupy a somewhat nebulous space between troops and management. The good DP trainer will play that position for everything it's worth.

Because of the visibility of their classroom role, DP trainers are the most apparent source of general technical support, even out of the classroom. They are sought out to answer questions, straighten misconceptions and solve problems in a wide variety of technology-related areas. Therefore, they have to be good listeners, and being a good listener means being a good diagnostician, with a quick eye for organizational consequences and interrelationships.

It may come as a surprise, but a superior DP trainer is also one who can look away from the course catalog and realize that more and better training is not the answer to every problem. What may seem on the surface to be a failure of training often turns out on closer inspection to be something else altogether — poorly designed work flow, inappropriate tool selection or low morale. The ability to recognize which is which is a crucial skill.

Once the diagnosis is made, it remains to convince the powers that be to apply the remedy. And here's where the DP trainer has to become a politician. Just as programmers can't hide in the computer room forever, DP trainers can't be effective if they sit in the training department brooding over their class rosters. Another requirement in DP training, then, is to be proactive.

Ineffective trainers can often be heard complaining that training is the wallflower at the corporate dance; it will surely ever be if the training function is content to wait for an invitation to the dance floor. But the DP trainer who wants to take an initiative posture rather than a reactive one had better have solid political skills.

One DP training manager describes this approach as "a little bit of conniving," although others would prefer to say salesmanship. Whatever you call it, effective training involves strong interpersonal skills, the ability to learn and use management's language and an instinct for the interplay of formal and informal channels of communication and influence.

A good DP trainer, then, is a technician, an evangelist, a businessman, an analyst, a counselor and a politician. Some of these roles are contradictory, so we have to add a postscript: A good DP trainer has to be something of a chameleon. That "really terrible poker player" who energizes a classroom has to be able to change gears on demand and, with equal facility, play cards with the experts or sling technical and business jargon.

The final word comes from Federal Reserve's Texer. A non-negotiable requirement for being a successful DP trainer is, she says, a good sense of humor. •

Stein is editor of *Data Training*, a Boston-based monthly publication for DP educators.

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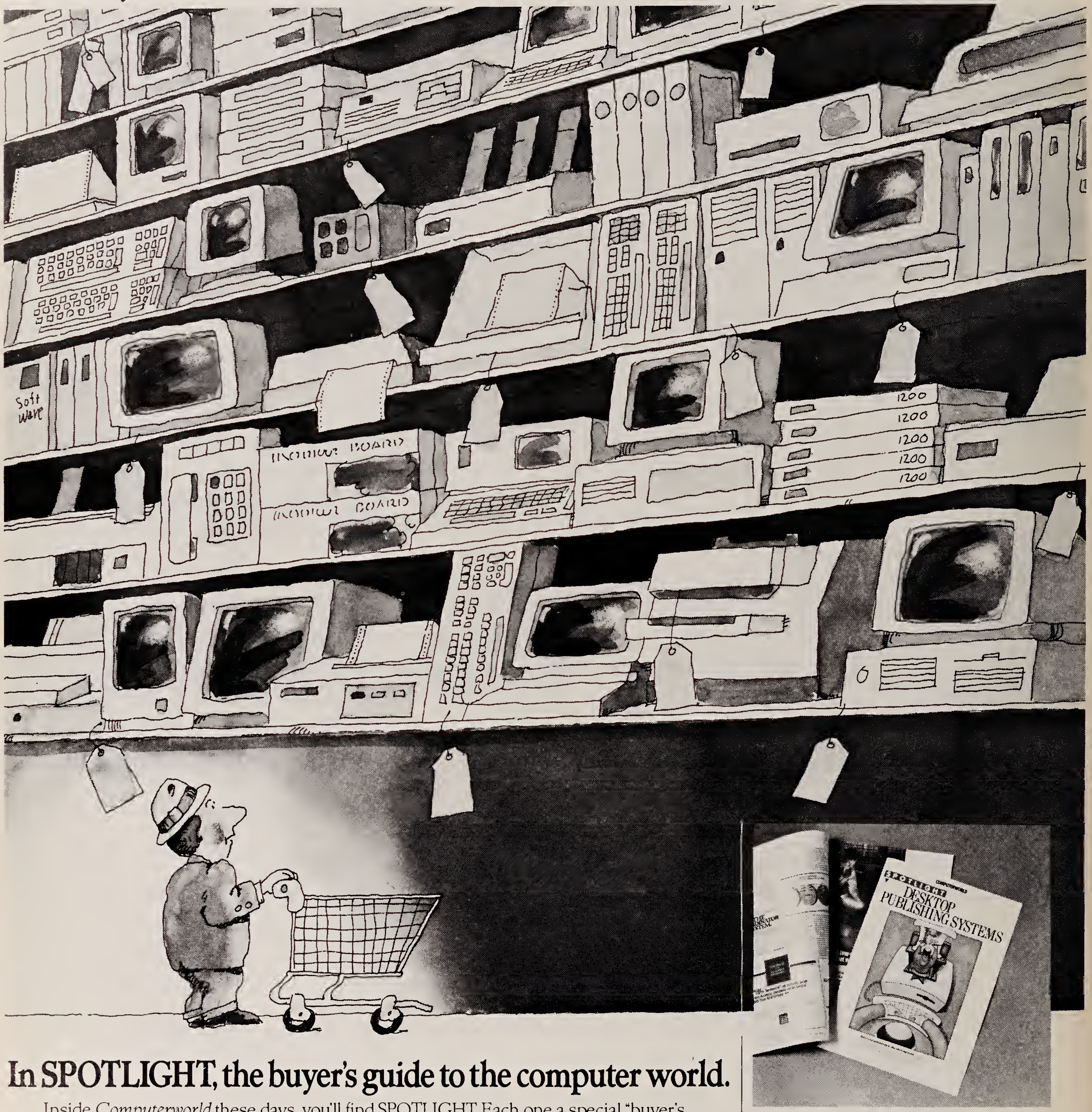

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Workstations

CONTINUED FROM PAGE 79

ket information can be consolidated on one monitor.

"All financial services companies are fighting a MIPS battle on the desk top," Golden says, referring to processor speed, which is typically measured in millions of instructions per second (MIPS). "They're all so reliant on technology. If a company can identify an opportunity five minutes before the guy down the street, it will make more money."

Sun has carved out business with more than 30 financial services customers, including nine of the 10 largest securities companies and a variety of value-added resellers and systems houses. One of Sun's major deals was with Quotron Systems, Inc., which recently signed an OEM agreement to market Sun-3 workstations with its financial information systems.

In its fiscal year ended June 30, Sun sold about $15 million worth of equipment to the financial services industry. The company expects to at least double that amount during the current fiscal year, Golden estimates. "It's the fastest growing market within our various business segments," he says.

Breaking ground

One of the earliest adopters of Sun workstations was Kidder, Peabody & Co., which last year replaced its IBM PC ATs with Sun 3/50 entry-level workstations in its formula trading area. In formula trading, a trader uses a workstation to scan the market for price aberrations and then send trade orders to the trading floor.

"We had been using ATs for 1½ years and had become intolerant of them because they were not fast enough," says Paul Sobota, a Kidder Peabody vice-president. "We needed multitasking and multiuser capabilities, and there was nothing around until Sun."

Market Vision Corp., a New York-based provider of computerized trading analysis and information services, recently ported its system to run on Sun workstations as well as on the IBM RT PC and Compaq Computer Corp. micros. "Advanced planners at all the brokerage houses feel the key point is that you can get more information for trading in less time with greater clarity," notes William Adiletta, vice-president of engineering. "That's very important to a Wall Street firm's success."

Apollo, which only started selling into the financial services market within the last year, counts Salomon Brothers, Inc., Morgan Stanley & Co., First Boston Corp., Citicorp, The Chase Manhattan Bank NA and Manufacturers Hanover Trust Co. among its major customers.

Like archrival Sun, Apollo has also focused on securities trading, banking and expert systems development. The Chelmsford, Mass., firm has also won a lot of business with packages tailored for financial services to handle office automation, data management and network monitoring and management.

Apollo expects that between 3% and 5% of its overall revenue will come from the financial services business next year, according to Frank. That could be $10 million to $30 million, he projects. Frank notes that a key test for Apollo and other workstation vendors will be pending automation contracts for stock exchanges in Chicago, London and Toronto.

Sniffer

CONTINUED FROM PAGE 79

Sniffer's potential as a revenue source — and the future of privately held Network General — hinges on convincing users that the product will pay for itself by keeping their networks healthy.

Saal claims that users tend to automatically buy an expensive component — such as an Intel Corp. 80386 server or a new bridge — to fix a network response-time problem that may not actually be the fault of the network.

Establishing where the fault lies, particularly on a multivendor network, is the Sniffer's specialty.

Users at Amoco Corp., for example, were running transmissions between an IBM MVS host and a VM host via Fibronics International, Inc. front ends, Proteon, Inc. gateways, another vendor's T1 multiplexers and yet another vendor's Ethernet LAN. "It was very slow; at certain times data couldn't get through at all," Saal says.

The Sniffer determined that the use of only one box was inadequate to handle packets coming in at high speed during busy times. "At least an interim solution was to expand that box's buffer size," Saal says.

To avoid tying the Sniffer to one network architecture, Saal has been steadily diversifying the product; it now supports the IBM Token-Ring network, Ethernet, Starlan and Datapoint Corp.'s Arcnet.

Currently, vendors make up a large portion of Network General's revenue. "Virtually every computer and communications company — including DEC and IBM — has at least one Sniffer," Saal says. Last week, Data General Corp. announced an agreement with Network General under which the two companies will jointly develop Sniffer to support DG's Starlan and Ethernet network architectures.

But Saal says he has high hopes for Sniffer sales through direct and indirect channels to users. Bridge Communications, Inc. and Micom-Interlan, Inc. are both said to be planning to resell Sniffer to users, as well as to use the product internally. "We think the market is not vendors," Saal says.

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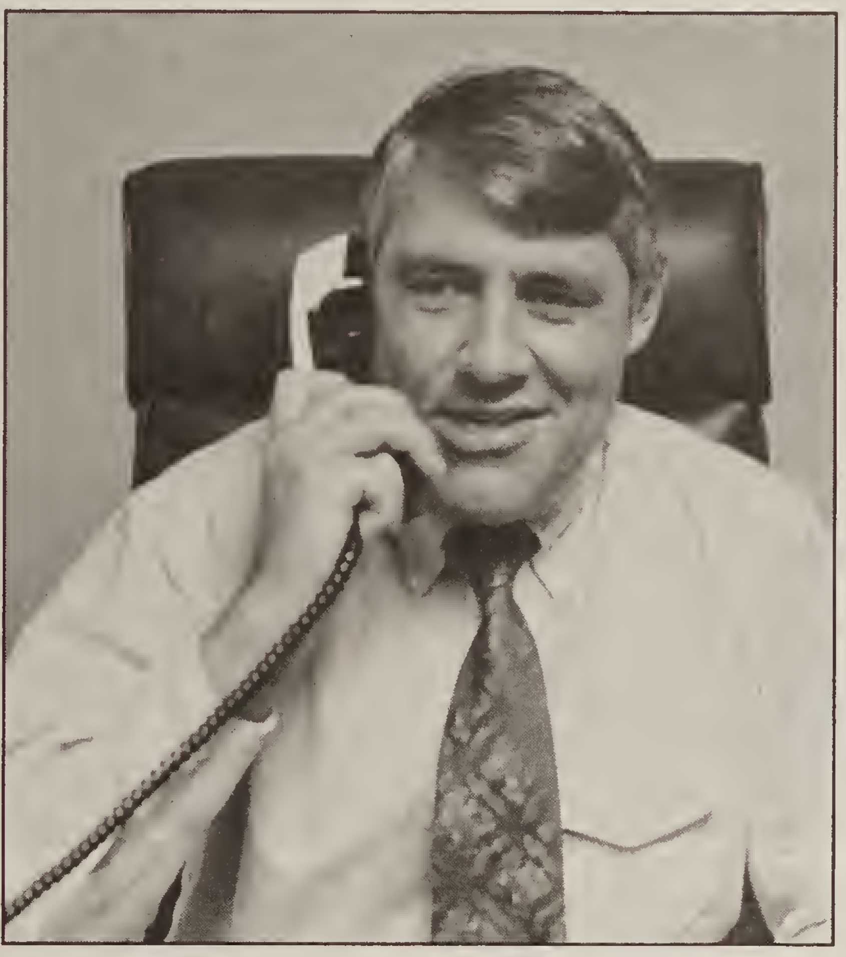
— *Phil Thomas*
Thomas Business Systems



Phil Thomas is President of Thomas Business Systems of Boca Raton, Florida. Thomas Business Systems buys, sells and leases new and used IBM, DEC and Data General equipment. They've been doing so for 10 years.

In that time, Phil has used many methods of getting his message across to buyers and sellers. He's advertised in several publications off and on. But for 10 years, he has advertised regularly (an average of once every two weeks) in *Computerworld's BUY-SELL-SWAP* section.

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Read-Rite cans top managers, lays off 100

BY JAMES A. MARTIN
CW STAFF

MILPITAS, Calif. — Read-Rite Corp., the troubled thin-film head supplier to hard disk drive manufacturers such as Maxtor Corp., recently fired its top management staff. Additionally, the firm laid off some 100 employees, more than 20% of its work force.

The company has been experiencing significant manufacturing problems since May, which have resulted in shipment delays for Maxtor and others that use the Read-Rite head for their 380M-byte, 5¼-in. hard-disk products.

Read-Rite's problems, however, are not expected to significantly affect those vendors that offer minicomputers, engineering workstations and microcomputers with the high-end thin-film media hard disk drives.

In-house disk drives

Some 15 vendors currently use that technology, including Apollo Computer, Inc., Digital Equipment Corp., IBM, Texas Instruments, Inc. and Floating Point Systems, Inc. But many of those vendors make their own hard disk drives and components for internal consumption, according to Dennis Waid, an industry analyst with Peripheral Research Corp. in Santa Barbara, Calif.

Maxtor, Micropolis Corp. and others that buy the critical hard disk drive component from Read-Rite are experiencing temporary declines in product shipments, however.

Maxtor, for example, recently said it expected to lose $20 million in revenue as a result of the decrease in Read-Rite's components.

Although Read-Rite is only one of a handful of thin-film head suppliers, one of its competitors, Peripheral Components International, Inc. in Minneapolis, has been increasing its manufacturing capacity and is expected to help fill the void.

Another alternative for hard-disk makers is to use the less expensive, more conventional hard-disk head technology in place of the newer, and more difficult to find, thin-film medium, Waid said.

New team being prepped

John R. Osborne, a Read-Rite founder and chairman, and President Wade Meyercord have been forced out, sources said, and a new management team is being put together by the company's financial backers.

Other staff cutbacks have focused on manufacturing and administrative personnel.

Read-Rite officials were not available for comment.

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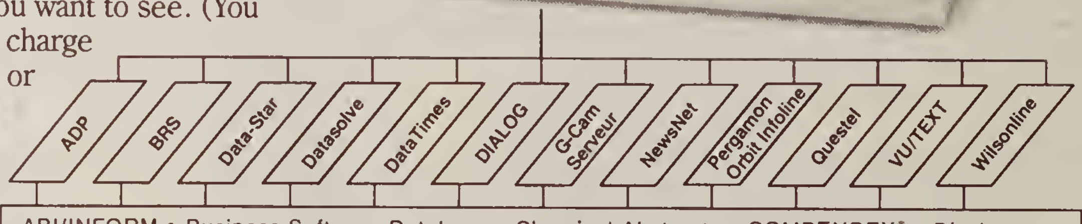

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NICKELS & DIMES

Uccel Corp. announced that revenue in the second quarter ended June 30 increased 39% to $47.6 million from $34.2 million a year earlier, when results included $3.2 million from software operations since divested. Profits from continuing operations before an extraordinary credit were $4.1 million, or 24 cents per share, up from $3.4 million, or 20 cents per share, in the like quarter of 1986.

Wyse Technology announced revenue for the first quarter ended July 3 of $80 million, compared to $52.6 million in the previous year. Profits were $5.7 million, or 44 cents per share, compared with $4 million, or 34 cents per share, in the like period a year ago.

Compugraphic Corp. announced revenue for the second quarter ended July 4 of $91.6 million, compared with $83 million a year ago. Net income was $2.6 million, or 31 cents per share, compared with a net loss of $1.8 million, or 22 cents per share, last year.

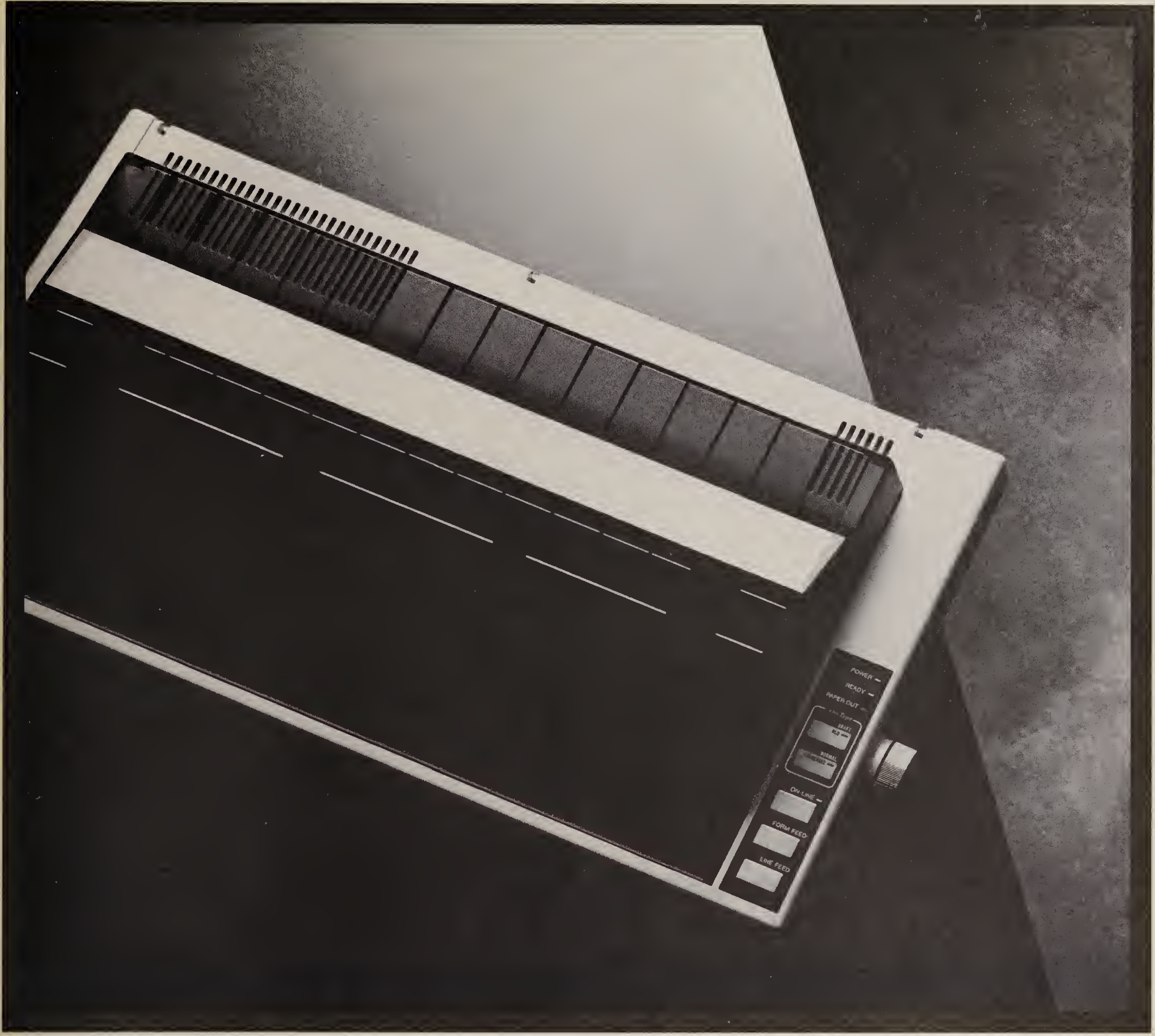
Software AG Systems, Inc. reported revenue for the fourth quarter ended May 31 of $19.5 million, compared with $18.7 million last year. Profits were $2 million, or 35 cents per share, compared with $1.9 million, or 33 cents per share, in the previous year.

Convex Computer Corp. announced revenue for the second quarter ended June 30 of $16.7 million, compared with $9.1 million in the previous year. Profits were $2.2 million, or 12 cents per share, compared with $920,000, or 7 cents per share, reported in the comparable period last year.

Sterling Software, Inc. announced revenue for the quarter ended June 30 of $46.7 million, compared with $56.5 million in the comparable period in the previous year.

Profits were $1.7 million, or 17 cents per share, compared with $2.1 million, or 20 cents per share, a year ago.

Policy Management Systems Corp. announced net income of $6.5 million, or 25 cents per share, on revenue of $43.6 million for the second quarter ended June 30. This compares with net income of $4.7 million, or 20 cents per share, on revenue of $35.2 million reported in the previous year.



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Instructors needed in-house

Data training jobs abound, offer path to management opportunities

BY NANCY BLUMENSTALK MINGUS
SPECIAL TO CW

An area not known for high salaries or rapid advancement, data training provides openings for MIS professionals who want to use their experience to help others implement information systems effectively.

"DP training allows people to use all their skills and communicate their experience to others," says Bill Milburn, data processing training specialist at the Auto Club of Southern California. "It's also a good background for any other position."

Many data trainers move on to management positions in other DP or user areas. This movement keeps the trainer from burning out in the long run. More important, as trainers rotate into management positions, companywide training tends to improve.

Openings are being created in many companies as people continue to move up the ladder. Technological changes are also increasing the demand for data trainers.

"There will always be a need for primary entry-level training and upgrading of analytical skills," Milburn says. "Right now, however, the thrust for PC and end-user training is much higher."

Personal computer user training is the primary entry into the data training field currently and will continue to be for the next few years.

"A lot of exciting things are happening in end-user training," says Jane Stein, editor of *Data Training* magazine. "That's probably the growth area because hard-core DP has not changed a lot. Technical DP training will continue to become more critical and have a higher level of emphasis in the future."

Earning expectations

Salaries for DP trainers fluctuate depending on the nature of the training. For instance, computer-based training (CBT) instructors need "extensive qualifications and get minimal dollars — rarely above $35,000," says Travis Piper, president of Creative Approaches, Inc., a CBT vendor in East Bloomfield, N.Y.

Most other trainers are in the same bind, with average earnings between $20,000 and $40,000 per year, usually far less than their programmer/analyst counterparts with similar experience.

Many people see the salary differential as a severe drawback to data training. Also, other than moving up the management ladder, training provides few other career paths.

"Where do you go from there?" asks Linda Rode, president of DP Training Resources in New York. "Just as not all programmer/analysts necessarily make good managers, many trainers may not be good as managers, either. And finding other opportunities may be difficult."

> "SOMEONE who can apply a good technical background to business problems and has a flair for teaching would have a good opportunity in this field."
>
> JANE STEIN
> *DATA TRAINING* MAGAZINE

While there may be drawbacks, data trainers also say there are currently many opportunities within the field.

As Milburn says, "Eighty percent to 90% of the companies across the U.S. have data trainers of some kind." Data training positions range from training administrators (who order and track vendor courses) to training specialists (who evaluate, design and deliver training) to data training managers.

In addition to different levels of trainers, there are differences among target populations as well. For instance, some trainers are responsible for just programmer/analyst training, some for the entire DP department and some for any computer training companywide.

Because of this diversity, specific qualifications for data trainers vary with the position, but there are some common points.

Piper looks for three things from candidates for jobs to develop CBT courses. "First and foremost, they have to have communication skills, especially written," he says. "Second, they need project control skills for course scheduling, handout development and so on. And third, they need a logical mind."

Whether a person is developing CBT or delivering stand-up training, these three traits are standard for all DP trainers, trainers say.

Technical skills crucial

Technical expertise is also a necessity. In fact, some give technical skills top priority. "The person must be a good instructor and communicator, but above all, he needs extensive experience with the product," Rode says.

Many companies require their trainers to have three to five years of experience with any given product.

"Someone who can apply a good technical background to business problems and has a flair for teaching would have a good opportunity in this field," Stein says.

Formal education requirements are not strict. Some companies do not require a degree at all, while others require a master's degree in education.

Whether or not formal credentials are expected, "some grounding in learning is beneficial, as is an affinity for teaching," Stein says.

Rode adds that trainers should possess some experience in classroom techniques, "which might not come to a person intuitively."

Companies also want trainers with some background in instructional, or course, design.

As one trainer says, "A lousy instructor can get by with a well-designed course, but an excellent instructor still muddles through with a poorly designed one."

Above all, the interaction with the students is the most important aspect of the training. "If you enjoy people, this can be an enormously gratifying profession to move into," Rode says.

Blumenstalk Mingus is a free-lance writer based in Buffalo, N.Y.

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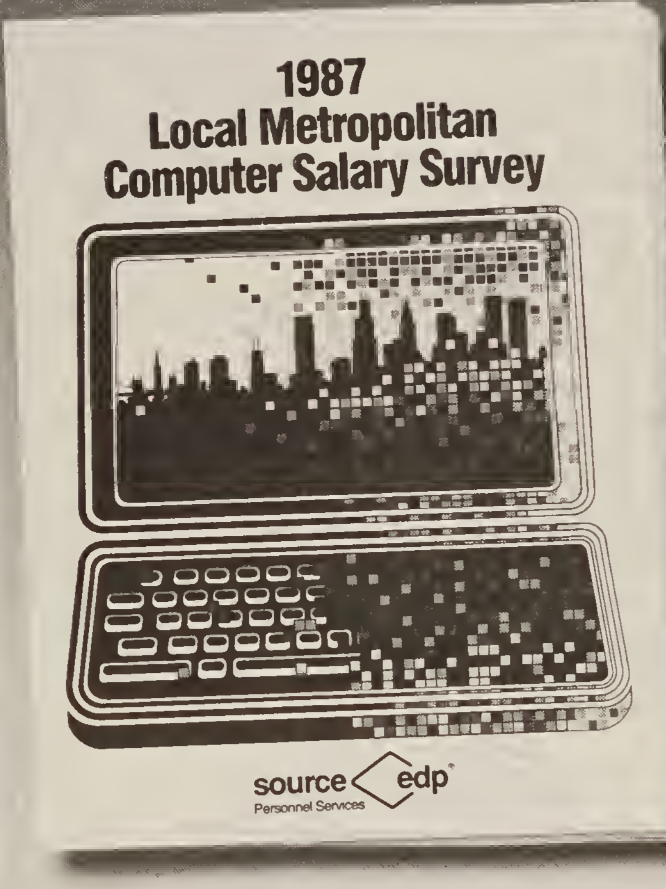

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The Language of instruction in the College of Engineering & Petroleum is English. All candidates must possess the Ph.D. at the time of application. Application forms and conditions of service can be obtained from:

Kuwait University Office
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Applications must be accompanied by non-returnable copies of academic credentials and representative publications. These must be sent directly to:

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We have recently completed a large strategic planning study and have a significant backlog of technical and application development projects. We are transitioning from a largely maintenance mode to an aggressive development mode. We are seeking talented individuals for the following:

APPLICATIONS DEVELOPMENT

- **Programmers**
  2-5 years structured coding experience in a development environment versus a maintenance environment. Highly desired experience would include: DATACOM; COBOL; IDEAL; CICS.
- **Systems Analysts**
  5-plus years experience in a development environment versus a maintenance environment. Highly desired experience would include: Structured analysis techniques; Relational Data Modeling; DATACOM/DB; On-line real-time systems; Arthur Andersen's Method/1; Prototyping; Application Generators.

CP&L offers competitive salaries, excellent benefits, and opportunities to advance. If interested in becoming part of our important team of professionals, send resume with salary requirements to: Susie **Brown, Recruitment Representative, Dept. CW8/24, CAROLINA POWER & LIGHT COMPANY, P.O. Box 1551, Raleigh, NC 27602.** An Equal Opportunity/Affirmative Action Employer.

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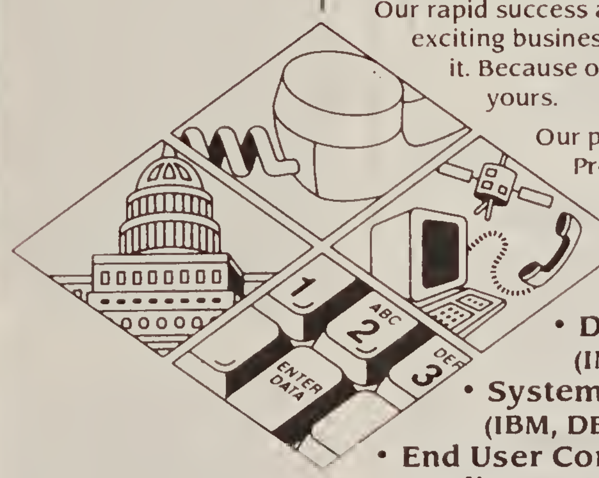

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BUSINESS SYSTEMS PROGRAMMER/ANALYST

Develop and implement computer-based system techniques and analysis methodologies for business, accounting, and financial management. Two years experience with BSCS or BBA, or MSCS or MBA in lieu of experience. Knowledge of computer/programming (FORTRAN, COBOL, BASIC) and accounting/financial analysis. $2950 per month. 40 hours per week. Job site/interview in Santa Fe Springs, CA. Send ad and resume to:

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Sr Systems Analyst. Will provide ongoing monitoring of Distribution Center Management System (DCMS) performance; change/impact analysis regarding user change requests; manage test environments; trouble shoot system related problems; participate in control of future DCMS (development of "cook-book" approach); training & documentation control of software. Requires: Technical Diploma in Data Processing & 3 yrs. exp. as Programmer/Analyst. Solid background with IBM S/38; expertise in all facets of wholesale distribution application software; analytical/-programming skills; ability to interview sr. management personnel with respect to computer related requirements; background in project management & proven organizational & written & oral skills. $3,000/mo. 40 hr. wk. Job Site/Interview: Corona. Qualif. applicants send resume or application letter to Job # NOF 733, P.O. Box 9560, Sacramento, CA. 95823-0560. No later than 9/9/87.

PROGRAMMER ANALYST. Program software to analyze business problems and convert information to programmable form. Advise management and analyze existing data handling systems. Modify current computer programs and provide input to operations manuals. Test, debug, revise and refine programs. Candidate must have at least 5/6 months COBOL experience in a health care environment using DEC systems; RDB, DTR, TDMS and ACMS and 2 years of equivalent graduate school training. Prefer experience and knowledge in Capitation, Retroactive Adjustments and Billing systems of an HMO. Must communicate well with end-user. Master Degree in Computer Science or Bachelor Degree in Computer Science plus 2 years experience. Job site/interview; Cypress, CA. Salary: $2,650 per month. Please send ad and resume to Job # AW8222, PO Box 9560, Sacramento, CA 95823-0560 not later than September 8, 1987.

PROGRAMMER/ANALYST: Analyze, design, code & implement a Back Office Acctg Syst for a major brokerage firm. Test & debug programs. Provide user training & back-up procedure. Document syst programs & all changes implemented. Req's extensive knowledge of a wide variety of hardware & software applications. 2 yrs exp or 2 yrs rel exp as Systems Analyst. Bachelor's in Computer Sci or Math. Hardware: IBM PC & Compatibles, IBM 4331, 4361, 370 Series, System 34. Software: ADABAS NATURAL/DIRECT CALL, DOS/VSE & DOE/VS, EASYTRIEVE/EASYTRIEVE PLUS, CICS Command Level, COBOL, MARK IV, VOLLIE/LIBRARIAN, ICCF, VSAM, ACCTG IV (Package). $30,000/yr, 40 hrs/wk. Pinkerton Computer Consultants, Inc. 20 Broad St, Suite 1302, NYC 10005. Send resumes, Att: AJ#071.

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Analyst/Programmer to handle on-line programming and systems analysis in customer information control operating systems (CICS) using COBOL. Designs, tests and codes software programs for travel/tour package. Handles data base creation using IMS and systems interface. Provides technical assistance. Evaluates, debugs and modifies aspects of operating system and software packages. Prepares reports of all modifications. Must have min. B.S degree in Computer Science or related field plus 2 yrs exp same job or 3 yrs exp same or related job if no degree; technical writing ability; excellent problem solving/analytical skills using models and flow charts; excellent oral and written communication skills; knowledge of data base creation and systems interface techniques. Hrs: Mon-Fri, 8am-5pm. Salary: $544.39/wk. Send resume only to Job Service of Florida, 701 SW 27th Avenue, Room 15, Miami, FL 33136. REF: Job Order # FL4539783.

SENIOR PROGRAMMER ANALYST - Design and develop pseudo code, documentations and specification test plans for development of modules for small subsystems. Require BS Computer Science or Engineering and two years experience and verifiable references. Job and interview site: Anaheim, CA, $29,300 per year. Send this ad and your resume to: Job #SK7742, PO Box 9560, Sacramento, CA 95823-0560, no later than 9/8/87. If offered employment must show you have legal right to work.

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•9373-20	0.5	4 to 16
•9375-40	0.5	8 to 16
4331-2	0.5	1 to 4
S/38-300	0.58	6 to 8
S/38-400	0.75	6 to 8
4341-1	0.88	2 to 4
S/38-600	0.98	8 to 16
S/38-700	1 1	16 to 32
•9375-60	1.2	8 to 16
4381-11	1.4	4 to 16
4361-5	1.45	2 to 12
4341-2	1.5	2 to 16
4341-12	1.65	2 to 16
†4381-21	1.9	8 to 16
4381-1	2.1	4 to 16
•9377-90	2.5	8 to 16
4381-2	2.7	4 to 32
4381-12	2.7	8 to 32
†4381-22	3.2	16 to 32
4381-13	3.6	8 to 32
3083EX	4.4	8 to 32
4381-3	4.5	8 to 32
†4381-23	4.7	16 to 64
3033-UP	5.0	4 to 24
4381-14	6.0	16 to 32
3083BX	6.6	8 to 32
•3090-120E	7.5	32 to 128
†4381-24	7.8	16 to 64
3083JX	8.8	8 to 32
3090-150	9.2	32 to 64
3081D	10.0	16 to 32
•3090-150E	10.0	32 to 64
3081 GX	11.9	16 to 64
3090-180	15.4	32 to 64
3081KX	15.5	16 to 64
•3090-180E	17.6	32 to 64
3090-200	27.7	64 to 128
3084QX	28.7	32 to 128
•3090-200E	31.9	64 to 128
•3090-300E	44.3	64 to 128
3090-400	50.0	128 to 256
•3090-400E	56.0	128 to 256
•3090-600E	76.0	128 to 256

• First Installation 1987
† First Installation 1st Qtr 1988

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SYSTEMS	MIPS	MEGABYTES
5840	8 4	16 to 128
5850	11.6	16 to 128
5860	14.0	16 to 128
5867	22 0	24 to 128
5868	22.0	32 to 256
5870	26.6	32 to 128
5880	26 6	32 to 256
•5890-190E	22	64 to 256
•5890-200E	31	64 to 256
•5890-300E	40	64 to 256
•5890-400E	58	128 to 512
•5890-600E	67	128 to 512

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SYSTEMS	MIPS	MEGABYTES
AS 9060	11	16 to 64
ASXL-50	15	32 to 64
AS 9070	16	16 to 64
AS 9080	20	16 to 64
AS XL-60	28	64 to 256
AS XL-80	50	64 to 256
•AS XL-90	67	128 to 512
•AS XL-100	80	128 to 512

The above information is intended as a guideline for computer users on relative computer systems instruction cycle times All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings However, Randolph is not responsible for the accuracy of the MIPS data Cycle times will vary based on hardware software configurations and system manufacturers continually modify computer models as design improvements in hardware and software arise.

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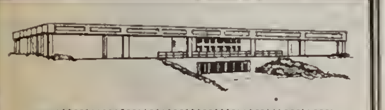

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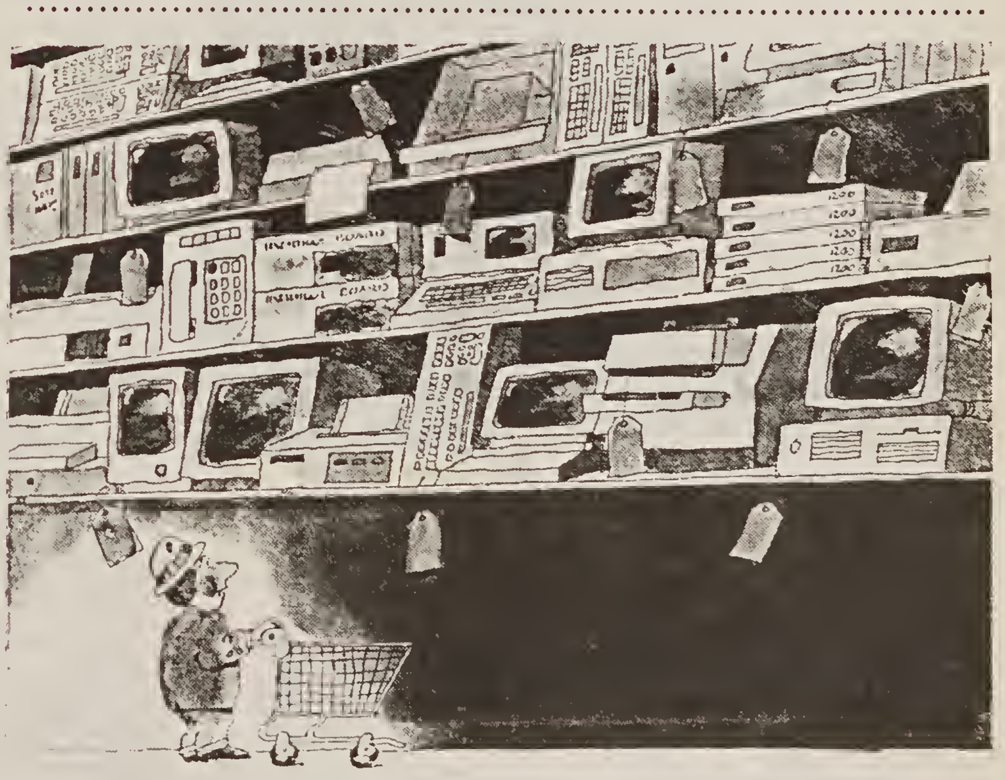

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Sept. 21	Hardware Roundup: Large & Medium Scale Systems	Sept. 4
Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18
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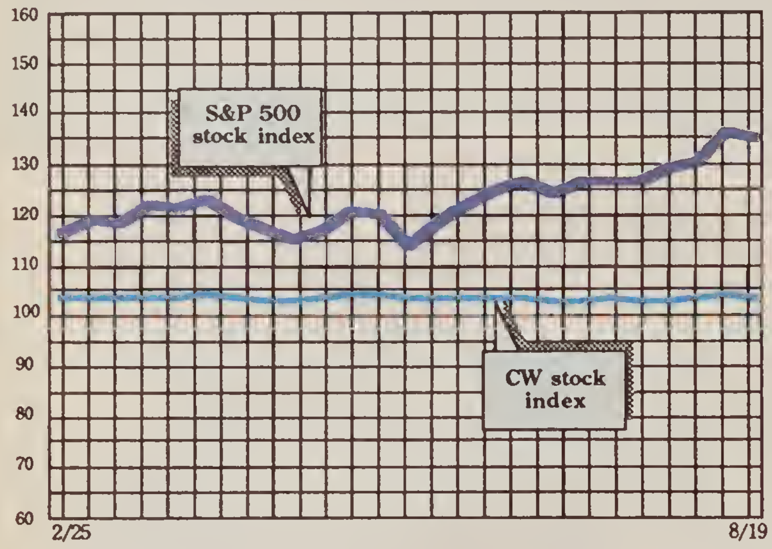

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Computer Systems	129.4	**128.3**
Software & DP Services	139.8	**139.3**
Semiconductors	129.5	**113.5**
Peripherals & Subsystems	118.5	**116.1**
Leasing Companies	119.5	**118.8**
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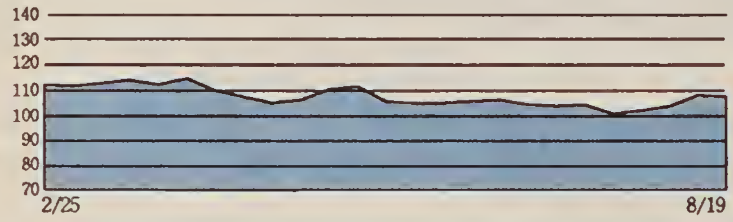
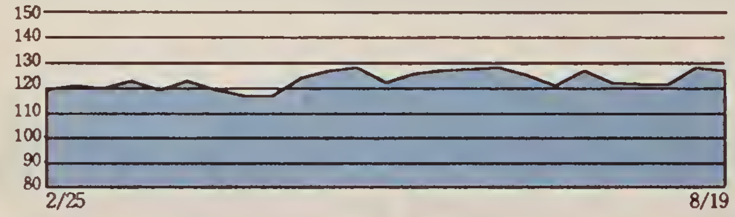
Communications



Computer Systems



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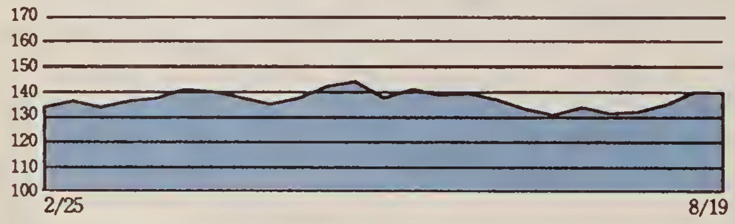
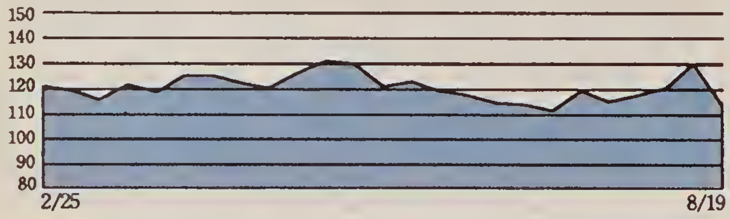
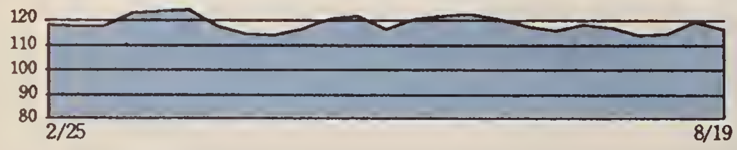


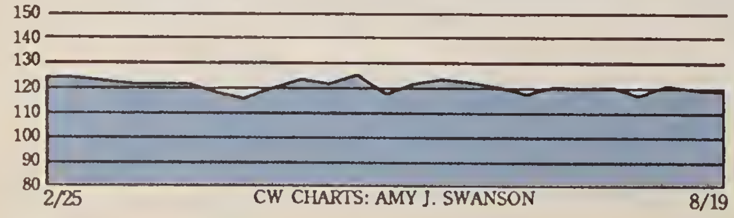
Semiconductors



Peripherals and Subsystems



Leasing Companies



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUG. 19, 1987

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE AUG. 19 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	101	77	94.50	+1.6	+1.7
Q	ANDREW CORP	19	14	17.00	+0.3	+1.5
Q	ARTEL COMM CORP	5	2	2.88	+0.0	+0.0
N	AT&T	36	22	34.25	-0.4	-1.1
Q	AVANT GAROE COMP INC	7	3	4.25	+0.0	+0.0
Q	AVANTEK INC	19	13	14.63	-0.4	-2.5
N	AYOIN CORP	38	18	31.88	+0.3	+0.8
N	BELL ATLANTIC CORP	77	62	74.88	+0.8	+1.0
N	8ELLSOUTH CORP	46	35	42.63	+1.1	+2.7
Q	8RIDGE COMMUNICATION	27	11	22.75	-0.5	-2.2
Q	COMPRESSION LA8S INC	12	4	4.50	-0.1	-2.7
O	COMPUTER NETWORK TECH	7	4	3.69	-0.1	-1.7
O	CONTEL CORP	40	27	37.50	-0.3	-0.7
Q	OATA SWITCH CORP	9	5	6.25	-0.1	-2.0
Q	OIGITAL COMM ASSOC	49	18	37.13	-0.4	-1.0
Q	OYNATECH CORP	44	27	31.00	+1.8	+6.0
Q	EQUATORIAL COMM CO	6	2	3.25	+0.0	+0.0
Q	GANDALF TECHNOLOGIES	11	5	7.25	-0.1	-0.9
Q	GENERAL OATACOMM INDS	14	8	8.00	-1.1	-12.3
N	GTE CORP	45	34	42.75	-1.3	-2.8
Q	INFOTRON SYS CORP	12	7	9.25	+0.0	+0.0
N	ITT CORP	66	47	63.38	-1.6	-2.5
N	M A COM INC	16	12	15.13	-0.4	-2.4
Q	MCI COMMUNICATIONS CORP	9	5	9.13	+0.5	+5.8
Q	MICOM SYS INC	18	10	12.00	-0.9	-6.8
Q	NETWORK SYS CORP	19	9	11.38	+0.0	+0.0
N	NORTHERN TELECOM LTO	24	14	22.88	-0.5	-2.1
Q	NOVELL INC	27	10	22.25	+0.4	+1.7
N	NYNEX CORP	76	59	74.25	+0.4	+0.5
N	PACIFIC TELESIS GROUP	31	23	30.50	+1.6	+5.6
N	PARAOYNE CORP	9	4	8.13	+0.5	+6.6
A	PENRIL CORP	6	4	4.38	-0.1	-2.8
N	PLESSEY PLC	41	24	29.50	-1.9	-6.0
N	SCIENTIFIC ATLANTA INC	20	9	19.25	+0.0	+0.0
N	SOUTHWESTERN 8ELL CORP	42	33	40.88	-0.1	-0.3
Q	3 COM CORP	24	9	16.88	-0.1	-0.7
N	TIMEPLEX INC	41	15	31.75	-2.0	-5.9
Q	UNGERMANN BASS INC	16	7	10.13	+0.4	+3.8
N	U S WEST INC	62	45	56.50	+1.4	+2.5

Computer Systems

Q	ALLIANT COMPUTER SYS	37	15	16.25	+0.3	+1.6
Q	ALPHA MICROSYSTEMS	7	3	5.00	-0.1	-2.4
Q	ALTOS COMPUTER SYS	17	10	13.50	+0.0	+0.0
A	AMDAHL CORP	44	17	40.75	-1.3	-3.0
Q	APOLLO COMPUTER INC	25	11	21.13	+0.8	+3.7
Q	APPLE COMPUTER INC	50	16	50.00	+1.3	+2.6
N	8OLT 8ERANEK & NEWMAN	30	19	21.13	-0.5	-2.3
Q	8RITTON LEE INC	5	3	3.25	-0.3	-7.1
N	COMPAQ COMPUTER CORP	55	14	54.25	+1.0	+1.9
Q	COMPUTER AUTOMATION INC	17	2	13.00	+0.5	+4.0
A	COMPUTER CONSOLES INC	12	7	7.50	+0.0	+0.0
Q	CONCURRENT COMP CORP	20	13	19.25	+0.3	+1.3
N	CONTROL OATA CORP OEL	35	22	34.75	+1.3	+3.7
Q	CONVERGENT TECH	12	4	7.75	+0.1	+1.6
Q	CONVEX COMPUTER CORP	22	8	15.00	-0.8	-4.8
N	CRAY RESH INC	136	69	110.50	-0.9	-0.8
Q	DAISY SYS CORP	13	7	7.63	-0.1	-1.6
N	DATA GEN CORP	39	25	33.25	-1.3	-3.6
N	DATAPOINT CORP	9	4	7.75	+0.8	+10.7
N	OIGITAL EQUIP CORP	185	89	179.50	-2.6	-1.4
N	FLOATING POINT SYS INC	17	8	10.50	+0.1	+1.2
N	GOULD INC	24	16	22.88	+1.3	+5.8
N	HARRIS CORP	43	27	37.50	-1.5	-3.8
N	HEWLETT PACKARO CO	69	37	65.00	-2.6	-3.9
N	HONEYWELL INC	91	58	86.88	-2.9	-3.2
N	IBM	175	116	172.63	+2.3	+1.3
Q	INFORMATION INTL INC	17	13	13.88	+0.1	+0.9
Q	IPL SYS INC	3	2	2.75	-0.4	-12.0
Q	MASS COMPUTER CORP	10	5	9.50	-0.1	-1.3
N	MATSUSHITA ELEC INDL LTO	178	89	169.00	-6.6	-3.8
Q	MEGADATA CORP	7	2	4.75	+0.0	+0.0
Q	MENTOR GRAPHICS CORP	34	13	30.88	-2.4	-7.1
N	N8I INC	14	B	11.88	+0.0	+0.0
N	NCR CORP	86	42	82.38	+0.0	+0.0
N	PRIME COMPUTER INC	30	16	27.63	+1.5	+5.7
Q	PYRAMIO TECHNOLOGY	12	4	7.75	-0.3	-3.1
Q	STRATUS COMPUTER	41	18	30.00	+0.3	+0.8
Q	SUN MICROSYSTEM INC	46	13	35.63	-0.9	-2.4
Q	SYMBOLICS INC	7	4	4.13	-0.3	-5.7
N	TANDEM COMPUTERS INC	38	16	30.25	-1.6	-5.1
N	TANDY CORP	56	31	48.75	+1.4	+2.9
N	ULTIMATE CORP	33	13	31.50	+0.9	+2.9
N	UNISYS CORP	48	22	44.75	-2.6	-5.5
A	WANG LABS INC	19	11	17.75	-0.6	-3.4

Software & DP Services

Q	AOVANCEO COMP TECH	6	3	3.63	+0.0	+0.0
N	AOVANCEO SYS INC	26	12	26.00	+0.5	+2.0
N	AGS COMPUTERS INC	22	8	19.25	-0.6	-3.1
Q	AMERICAN MGMT SYS INC	19	7	17.25	-0.4	-2.1
Q	AMERICAN SOFTWARE INC	22	8	17.25	-0.3	-1.4
N	ANACOMP INC	11	3	9.88	-0.1	-1.3
Q	ANALYSTS INTL CORP	9	3	8.38	-0.1	-1.5
Q	ASHTON TATE	30	12	24.00	-1.3	-5.0
Q	ASK COMPUTER SYS INC	17	10	14.25	-0.6	-4.2
Q	AUTODESK INC	34	10	27.50	-0.1	-0.5
N	AUTO DATA PROCESSING	54	30	52.75	+2.1	+4.2
Q	8OOLE & 8AB8AGE INC	12	4	10.50	-0.5	-4.5
N	COMPUTER ASSOC INTL INC	31	10	28.88	-0.6	-2.1
Q	COMPUTER HORIZONS CORP	15	10	12.50	-0.9	-6.5
N	COMPUTER SCIENCES CORP	61	30	58.75	+0.4	+0.6
N	COMPUTER TASK GROUP INC	18	11	13.13	+0.8	+6.1
Q	COMSHARE INC	28	11	25.25	-1.0	-3.8
N	CULLINET SOFTWARE INC	13	6	12.88	+0.0	+0.0
Q	CYCARE SYS INC	12	7	9.25	-0.5	-5.1
Q	OUQUESNE SYS INC	33	12	17.25	-1.8	-9.2
Q	ENOATA INC	12	5	10.00	+0.5	+5.3
N	GENERAL MTRS (CLS E)	49	24	47.38	-0.4	-0.8
Q	HOGAN SYS INC	17	9	12.38	+0.5	+4.2
Q	INFORMIX CORP	23	7	19.75	-1.3	-6.0
Q	INTELLICORP INC	11	4	7.00	-0.1	-1.8
Q	KEANE INC	10	5	7.13	+0.4	+5.6
Q	LOTUS OEV CORP	37	11	33.50	+0.8	+2.3
Q	MANAGEMENT SCI AMER	21	11	12.38	+0.3	+2.1
Q	MICRO PRO INTL CORP	8	2	5.63	-0.3	-4.3
Q	MICROSOFT CORP	128	26	102.50	+2.5	+2.5
Q	NATIONAL OATA CORP	34	17	31.88	-0.9	-2.7
Q	ON LINE SOFTWARE INTL INC	22	6	19.88	-0.1	-0.6
Q	ORACLE SYS CORP	30	7	24.25	-1.6	-6.3
N	PANSOPHIC SYS INC	23	12	18.75	-0.3	-1.3
Q	POLICY MGMT SYS CORP	30	15	23.25	-1.0	-4.1
Q	PROGRAMMING & SYS INC	13	8	12.63	+0.1	+1.0
Q	REYNOLOS & REYNOLOS CO	42	27	36.25	+0.0	+0.0
Q	SEI CORP	18	8	16.50	-0.5	-2.9
Q	SHAREO MEO SYS CORP	53	23	25.63	-0.1	-0.5
Q	SOFTWARE AG SYSTEMS INC	20	10	12.63	-0.1	-1.0
Q	SOFTWARE PUBG CORP	17	5	10.13	+0.9	+9.5
A	STERLING SOFTWARE INC	19	9	9.75	+0.4	+4.0
Q	SUNGARO OATA SYS INC	21	10	18.25	+0.0	+0.0
Q	SYSTEMATICS INC	30	14	28.00	+1.3	+4.7
N	UCCEL CORP	52	20	48.75	-0.3	-0.5
N	URS CORP	21	13	19.00	+1.3	+7.0
Q	VM SOFTWARE INC	45	15	19.50	+1.0	+5.4

Semiconductors

N	ADV MICRO OEVICES INC	25	13	20.38	-0.1	-0.6
N	ANALOG OEVICES INC	24	14	20.75	-1.6	-7.3
Q	ANALOGIC CORP	13	10	12.25	-0.3	-2.0
Q	INTEL CORP	52	18	50.25	+0.3	+0.5
Q	LSI LOGIC CORP	17	8	11.13	-0.8	-6.3
Q	MONOLITHIC MEMORIES INC	19	10	0.00	-17.6	-100.0
N	MOTOROLA INC	67	34	62.88	-1.8	-2.7
N	NATL SEMICONOUCTOR	17	8	14.38	-0.6	-4.2
N	TEXAS INSTRS INC	70	35	69.00	+0.1	+0.2
A	WESTERN DIGITAL CORP	33	13	27.38	-0.4	-1.4

Peripherals

N	AM INTL INC	9	5	8.25	+0.4	+4.8
Q	AST RESH INC	23	11	16.88	-1.3	-6.9
Q	AUTO TROL TECH CORP	9	3	6.00	-0.6	-9.4
Q	8ANCTEC INC	16	6	12.25	-0.5	-3.9
Q	CIPHER DATA PROOS INC	18	9	10.38	+0.1	+1.2
A	COGNITRONICS CORP	5	2	4.38	+0.5	+12.9
N	COMPUGRAPHIC CORP	25	16	24.75	+0.0	+0.0
N	COMPUTERVISION CORP	23	12	14.75	-1.1	-7.1
N	CONRAC CORP	30	12	0.00	+0.0	+0.0
A	OATAPROOUCTS CORP	16	10	11.63	-0.1	-1.1
A	OATARAM CORP	10	7	7.38	+0.0	+0.0
N	OECISION INOS CORP	13	7	10.88	-0.3	-2.2
N	EASTMAN KODAK CO	102	52	100.13	+1.4	+1.4
Q	E M C CORP MASS	38	11	36.00	-0.3	-0.7
Q	EMULEX CORP	10	6	7.50	-0.3	-3.2
Q	EVANS & SUTHERLANO	40	20	33.25	-0.8	-2.2
Q	ICOT CORP	13	5	6.25	+0.0	+0.0
Q	INTERLEAF INC	20	8	16.75	-0.1	-0.7
Q	IOMEGA CORP	12	2	2.75	-0.5	-15.4
Q	LEE DATA CORP	10	5	4.88	-0.3	-4.9
Q	MASSTOR SYS CORP	6	2	4.88	+0.3	+6.8
Q	MAXTOR CORP	34	12	14.00	+0.0	+0.0
Q	MICROPOLIS CORP	44	14	33.75	-3.5	-9.4
Q	MINISCRI8E CORP	18	5	13.75	-1.5	-9.8
N	MINNESOTA MNG & MFG CO	83	50	79.38	-0.1	-0.2
A	MSI DATA CORP	19	10	18.25	-0.1	-0.7
Q	PRIAM CORP	6	2	3.63	-0.4	-9.4
Q	PRINTRONIX INC	14	10	11.25	-0.8	-6.3
N	QMS INC	22	11	22.00	+0.9	+4.1
Q	QUANTUM CORP	35	15	17.25	-0.3	-1.4
Q	RAMTEK CORP	6	4	5.63	+0.1	+2.3
N	RECOGNITION EQUIP INC	27	12	19.38	+0.0	+0.0
Q	REXON INC	14	5	10.00	-0.3	-2.4
Q	SCAN TRON CORP	17	11	12.50	+0.0	+0.0
Q	SEAGATE TECHNOLOGY	46	12	30.13	-1.0	-3.2
N	STORAGE TECH CORP	5	2	3.13	-0.3	-7.4
Q	TANOON CORP	7	2	4.13	+0.1	+3.1
A	TEC INC	7	3	4.50	-0.3	-6.5
N	TEKTRONIX INC	43	29	39.88	+0.4	+0.9
Q	TELEVIOEO SYS INC	3	2	2.94	-0.1	-4.1
N	TELEX CORP	102	55	63.50	+0.1	+0.2
Q	WYSE TECH	35	13	32.00	+0.6	+2.0
N	XEROX CORP	83	51	80.00	+0.6	+0.8
Q	XIOEX CORP	20	11	12.63	-1.3	-9.0

Leasing Companies

N	COMOISCO INC	33	15	30.63	-0.3	-0.8
N	CONTINENTAL INFO SYS	14	7	11.13	-0.4	-3.3
Q	PHOENIX AMERN INC	8	3	4.38	+0.1	+2.9
Q	SELECTERM INC	7	5	5.25	+0.0	+0.0
N	U S LEASING INTL	55	40	53.25	-1.0	-1.8

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL;
O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE 8I0 PRICES AS OF 3 P.M. OR LAST 8I0
(1) TO NEAREST DOLLAR

High times

IBM, DEC, Compaq join crowd reaching yearly highs

Although the surge in computer industry stocks slowed last week, a strong market gain Thursday kept most issues on a modest upswing.

IBM and Digital Equipment Corp. were both among those reaching new highs for the year on the New York Stock Exchange Thursday. IBM closed at 174¾, up 1½ points in four trading days, while DEC rose 1¼ points to 184¾. Compaq Computer Corp. was one of the industry's best performers, climbing 3½ points to close Thursday at 56½, also a new high.

Apple Computer, Inc. continued to reward investors on the over-the-counter market, rising 2¾ points to 51¾, its high since a stock split earlier this year. Other over-the-counter issues recording new highs included Massachusetts Computer Corp., 10⅜; MCI Communications Corp., 9⅜; Norsk Data A.S., 41⅞; and Scientific Micro Systems, Inc., 7⅞.

Endata, Inc., a Nashville-based vendor of computer imaging and microfiche services, rose almost 40% Thursday, up 3⅞ points to 13⅞, after its announced $65 million acquisition by First Financial Management Corp.

CLINTON WILDER

Spectrum bears business fruit

HP ships processors to customers, enters non-HP terminal field

BY JEFFRY BEELER
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. this week will begin shipping limited quantities of the first business-oriented by-product of its Spectrum development project.

In addition to that announcement last week, the company made its first foray into the non-HP terminal arena with the introduction of display units for IBM, Digital Equipment Corp. and general-purpose ASCII environments.

A company spokesman declined to specify the number of units in its initial batch of HP 3000 Series 930 departmental processors and would only identify one customer, a software developer and reseller of HP systems.

ASK Computer Systems, Inc. in neighboring Los Altos, Calif., is scheduled to take delivery of a 930 later this week.

David Sohm, the firm's vice-president of marketing, said the processor will join the existing HP 3000 Series 58 and three Series 70s in developing and supporting the 19 integrated modules of ASK Computer's Manman line of manufacturing-oriented applications.

End of a chapter

This week's shipments to ASK and other selected HP hardware buyers close a long and often troubled chapter in the 930's history. Introduced in February 1986 and embodying HP's unconventional Precision Architecture, the machine was scheduled to become available in limited quantities by the end of last year but was delayed first to mid-1987 and later to this month.

In the terminal arena, HP introduced the HP 700 family of display units. Included in the new HP 700 terminal line are the following:

- The Model 71, an IBM-compatible product priced at $695, 45% less than IBM's 3191 Models A and B.
- The $575 DEC-compatible Model 22, which undersells DEC's VT220 by 22%.
- The Model 41, which, with its $375 price tag, reportedly ranks among the industry's least expensive general-purpose ASCII terminals.
- The Model 92, which, at $895, replaces and sells for 35% less than the existing HP 3000 series-compatible Model 2392 terminal.

The introduction of Models 71, 22 and 41 marks the first time in HP's 12 years as a terminal maker that the firm has offered display units for customers of other vendors' hardware, according to company sources.

Along with the terminal announcement, HP announced it had cut by 36% the price of its HP 9000 Model 318M engineering workstation. The new price is $4,990. That pricing change accompanied the introduction of four additional models that start at $12,950.

Tandem PCs lashed to Nonstop CPUs

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. today is expected to extend its IBM-compatible workstation line with the announcement of seven personal computer models built around Intel Corp. 80286 and 80386 microprocessors.

Members of the Tandem PSX/200 and PSX/300 workstation families complement the company's existing 6AX series of IBM Personal Computer AT-compatible desktop devices. The PSX machines are intended to serve primarily as intelligent terminals in a network built around Tandem's Nonstop family, according to Jim Pawlik, product manager with Tandem's Micro Products Division.

To tailor the workstations for a Tandem environment, the systems' features include the following:

- Software that allows the desktop units to communicate with Tandem hosts by emulating the vendor's Model 6530 terminal.
- A capability to transfer files between Microsoft Corp. MS-DOS 3.2-based workstations and Tandem's Guardian system.

The PSX models also support ANSI 3.64 terminal emulation to enable them to communicate with Tandem's recently introduced Unix-based LXN distributed processing system.

On the 80286 side of the PSX introduction, Tandem is offering five models, ranging from the PSX/200, a diskless unit with an 8-MHz microprocessor that is priced from $1,195, to the PSX/240, which has a 40M-byte hard disk and a 12-MHz CPU and is priced from $3,795. Filling out that line are the Model 201, which starts at $1,395 and lacks a hard disk, and the 220E and 220, which both have 20M-byte mass-storage subsystems. The $2,395 Model 220E runs at 8 MHz, and the $2,995 Model 220 operates at 12.5 MHz. On the 386 side, the $4,895 PSX/340 and the $5,695 PSX/370 both use the same 16-MHz microprocessor but have different hard-disk capacities.

Play it again

FROM PAGE 1

industry matures. A survey conducted by the Data Processing Management Association in November 1986 found that 42% of that group's members are more than 40 years old and that 20% are over 46. In addition, MIS professionals are taking advantage of too-good-to-be-true early retirement incentives from companies seeking to thin out the ranks.

Too good to refuse

Oldenburg admits he "never really thought about retiring" from his MIS director position at Chevron. But when the oil industry hit a slump last year, he found he could not resist an early retirement offer.

Since he retired in December 1986, Oldenburg has continued his active involvement in the industry. He recently returned from Italy, where he taught a two-day MIS seminar for 35 of the country's top businessmen. This fall, he will begin a part-time teaching assignment in MIS at the University of California at Berkeley.

Oldenburg says he enjoys juggling a plateful of activities with his time. And he boasts that he can now go to his mountain cabin on a Thursday, for example, instead of waiting until Saturday when his workweek ended.

"I'm really enjoying myself," he says. "I have flexibility to do the things I want to do."

The throng of MIS directors leaving the job ranks yet remaining active in their professions is good for both them and the industry, observed John Kallelis, vice-president of ARA Services, Inc., a Philadelphia-based management services firm. With a wealth of experience in planning and technology, these new retirees are able to dispense practical advice rather than spout theory.

Roy Dickson, former chief information officer at Phillips Petroleum Co. in Borger, Texas, worked there for 33 years. Dickson left in June 1986 under an early retirement program.

"I am not quite 53 years old, and I thought then that this would be a nice opportunity for me to do other things," Dickson recalls. His retirement did not last long. A month later, IBM flew Dickson to New York to attend a management meeting. Harvard University's Business School also asked him to give a lecture on cost control in data processing.

Charles Oldenburg

Dickson today runs Dickson Associates, an MIS consulting firm. Half of his time is spent formulating marketing strategies for industry vendors such as IBM. The rest is spent consulting with large user corporations, including Illinois Bell, American Airlines and Equitable Life Insurance Co.

Not ready yet

"I was not ready to throw it all away," Dickson says of his decision to go into consulting. "I don't think I will consider real retirement until I am about 60. For now, I enjoy the issues and problems of managing technology, and I want to be able to use my skills."

Consulting is a prevalent second-career option among former MIS managers. Many say they dreamed for years about scheduling their own hours and being their own bosses. But many also acknowledge the inherent danger of jumping back into the rat race too soon.

Jack Lanahan, 73, served as a consultant for three years after retiring from his job as MIS director at Inland Steel Co. Lanahan says he "got into consulting to taper off from the full-time job. After I retired in 1979, I didn't just want to drop everything altogether."

However, Lanahan soon found he was spending every sixth week on business trips. He retired permanently three years later and now lives in Santa Barbara, Calif.

Irvine, Calif.-based Ken Garrison, 59, says he also hoped that his consulting work would give him the luxury of managing his own hours. "When you are a consultant, you have to fit your hours to your client's business requirements," explained the former vice-president of information systems at Pacific Mutual Life Insurance Co.

David Blackwell

When he started Kenneth T. Garrison Associates, many of his contacts were insurance industry clients based on the East Coast. Garrison says that although he enjoyed his new career, traveling and working long hours were rapidly turning retirement into a full-time job.

"To manage your time, you have to schedule your fun activities and make them just as important as your consulting," he adds. "It's too easy to become a workaholic and wind up straying far from your original plan."

For some MIS managers, the transition to retirement is the difficult part. MIS managers at Fortune 500 companies typically work 10- and 12-hour days, direct departments of several hundred employees and handle responsibilities that affect the corporation's bottom line.

Waking up in the morning to none of those duties can be hard for those who thrived on their jobs.

"When you have worked for 33 years, adjusting to retirement is a struggle," Dickson says. "You have to prepare yourself mentally to leave it. It's kind of like leaving home. It is a big part of your life."

David Blackwell says he also found the change startling. Blackwell, 60, a former MIS official at Massachusetts Mutual Life Insurance Co., says he misses the people he worked with and the corporate support staff. As a consultant, "I do all the mail myself," he says.

Who needs it?

But one former MIS executive, who wishes to remain anonymous, says he found no problem adjusting at all and did not want to have anything to do with "technobabble" after he retired last year at age 58. The closest he ever got to considering employment again, he says, was clipping an MIS help-wanted ad out of the Wall Street Journal.

"Who needs the rat race? After I left, I lost 20 pounds, my blood pressure returned to normal and my relationship with my wife improved," he says. And since then, he has taken two cruises, signed up for cooking classes, learned how to play bridge and completed two Spanish courses. Next month, the former exec will go to Europe for the sixth time in his life.

"Call me a maverick, but there's a whole other world out there. Life is not all bits and bytes."

Western Digital funding Tandon

IRVINE, Calif. — Western Digital Corp. and Tandon Corp. reportedly are negotiating an agreement to jointly manufacture and market a 3½-in. hard disk drive product for Tandon and OEM microcomputer vendors.

Under the terms of the agreement, Western Digital will lend Tandon some $12 million to increase latter's working capital.

The loan will be secured by assets and technology owned by Tandon. The agreement would enable both companies to cut costs and offer greater opportunity for product enhancements.

"The agreement will allow Western Digital to put together a single process designed to manufacture intelligent Winchester drives, which will reduce costs and risks in quality and reliability," according to Kathy Braun, vice-president and general manager of storage products.

The agreement will allow Western Digital to move swiftly into the disk drive market and toward its goal of being a complete OEM systems supplier, according to James Stone of Shearson Lehman Brothers, Inc. "It's a situation that is highly beneficial to them both," Stone added.

CASE

FROM PAGE 1

pears more likely to address the need for a DB2 dictionary. IBM has yet to provide a dictionary capability for its relational data base management system.

The $200,000 Casepac features mainframe-based graphics using IBM 3270 terminals, Graphical Data Display Manager and ISPF and an integrated data dictionary that allows all information collected during the development cycle to be shared by developers and data administrators.

On-Line Software officials said the mainframe orientation ensures data consistency.

The CASE features can be used to create data flow diagrams and entity models from which data can be mapped into the Casepac dictionary and validated. The same dictionary can then be used to support the finished application.

The Casepac dictionary supports IBM's Data Definition Language, can generate tables based on dictionary entries and can create indexes. The company said the dictionary can also be populated from existing IBM IMS Program Specification Blocks (PSB), Cobol data division statements and DB2 catalogs.

The Casepac dictionary does not address a major shortcoming of IBM's data dictionary approach — the lack of referential integrity — but an On-Line Software spokesman claimed referential integrity is useless unless the data base supports it.

IBM's only approach to a DB2 data dictionary is a product that can be used to handle physical DB2 data base design [CW, May 25]. IBM has called this dictionary an interim solution while the company works on a real data dictionary for DB2, a development that is at least three years away, analysts said.

Casepac was originally developed for Fireman's Fund Insurance Co. in San Francisco, which was seeking an integrated data dictionary to replace six incompatible data dictionaries. The insurer is using Casepac because of DB2's data dictionary shortcomings, according to Ronald Voell, Casepac project director at Fireman's Fund.

Tired of waiting

"We can't wait anymore for IBM," Voell said. "Two hundred thousand dollars is peanuts compared with the productivity that comes from this product."

Voell said his firm expects to use the product beginning next month as its primary means to develop DB2 applications. In its three beta-test projects, Fireman's Fund is using Casepac to develop a data archiving facility and an automated electronic forms-generation facility and to build a large data base for its commercial lines of business.

On-Line Software is also working with Tata to develop a Casepac interface for its recently unveiled application generator, called Intelagen. The link would position Casepac and Intelagen as a mainframe-based alternative to Excelerator, which can be linked to Pansophic Systems, Inc.'s Telon application generator via a recently unveiled interface [CW, Aug. 10].

Index Technology's XL/Interface Telon is expected to be available later in the third quarter. Pansophic reportedly intends to offer the link in its next release of Telon, scheduled for mid-1988.

Howard Sorgen, president of On-Line Software, would not commit to a shipping date for the Intelagen-Casepac interface but said it would be available before XL/Interface Telon.

By linking Casepac with Intelagen, On-Line Software says it hopes to eliminate much of the redundancy in data specification setting and report generation that occurs when using front-end design tools and application code generators separately.

Ronald G. Ross, editor of the "Data Base Newsletter," questioned the need for mainframe-based CASE products, saying most users are looking for personal computer-based bit-mapped graphics and mainframe-like repositories for designs and dictionaries. "I don't think anyone would argue the advantages of the PC unless they were entrenched in the mainframe mind-set and have blinders on," he said.

Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y., said Casepac's strength is its data dictionary, which facilitates the design of DB2 applications. Even though it is called a CASE tool, the product still needs some work as a full-fledged application design aid, she added.

Although targeted primarily at DB2 users in IBM MVS shops, Casepac can also be used to develop applications to run under IMS or IBM's VSAM, Tata and On-Line Software said.

INSIDE LINES

Get out the umbrellas. A source at Goldman Sachs reports that the Wall Street investment firm is billing insurance companies $13 million for damages suffered when a water pipe cracked above company headquarters' data center [CW, Aug. 3]. The bill covers the replacement of several IBM mainframes and reportedly includes $800,000 for four days of labor. The two insurers facing the claims aren't pleased.

An A937 or, perhaps, a 9/1100? On Sept. 2, Unisys will reportedly announce a mainframe product that is geared toward entry-level users. The product will be compatible with old Burroughs systems, a source close to the company said. Unisys Chairman W. Michael Blumenthal will preside at the proceeding, which, Unisys says, is to "celebrate the birth of a new computing concept."

U.S. Grade A. The U.S. Department of Justice put its stamp of approval on Computer Associates' acquisition of Uccel last week. The final purchase price was set at $830 million. No announcements about potential organizational changes were made last week. Computer Associates Chairman Charles Wang and President Anthony Wang will meet with Uccel executives in upcoming weeks to merge the two organizations.

All DEC'd out. DEC is expected to round out its VT300 line Tuesday by announcing the VT320 text terminal. Many analysts were surprised that DEC didn't introduce the product, which replaces the VT220, at the April debut of the monochrome VT330 and color VT340 text and graphics terminals. "This is the longest awaited birth on record," one analyst quipped. The new unit should cost a little less than the $795 VT220.

On the warpath, again. Although AT&T has been scaling back its computer business lately, look for the telecommunications giant to announce a multiprocessor system containing between eight and 16 of its WE32000 series 32-bit microprocessor chips next month. One source says the new system may replace many of AT&T's existing and "generally uninteresting" 3B2 systems, which have not fared very well in the commercial area.

Netview freedom fighters. A cabal of "major computer and communications companies" secretly working on an alternate network management standard to IBM's candidate, Netview, is reportedly headed by (who else?) AT&T. The vendors are concerned that IBM has already gained considerable industry support for Netview/PC as a common interface for sending alerts and other data to the host-based Netview. The group may come out into the open soon. "We predict aggressive action quickly to combat the IBM initiative through a pretty powerful development effort," says a spokesman for Timeplex, an admitted member of the cabal.

Behind Curtain No. 1 . . . A well-known mid-range system consultant says DEC's to-be-announced "Microvax III" will be known as the Microvax 3000 when it's rolled out at Decworld next month. The 2- to 3-million-instruction-per-second system will offer better price/performance than its predecessor, the Microvax II, which will remain on the market, the analyst predicts.

The grass isn't always greener. The proposed acquisition of Tallgrass Technologies by CMS Enhancements has fallen through, according to both companies. In a letter of intent signed July 7, CMS said it planned to acquire Tallgrass for an undisclosed amount of stock and cash. But last week, a CMS spokesman said the letter had been allowed to expire without the two companies agreeing on terms.

Post-Postscript? Quadram is expected to announce at PC Expo a Postscript laser printer designed to compete with the likes of AST Research's Turbolaser/PS model. The company would not say if the printer uses the actual Adobe Systems Postscript-licensed driver or if the printer is only Postscript compatible. Meanwhile, Adobe is apparently not pleased at the increasing number of Postscript clones appearing on the market.

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